

DEC 17 1956

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DECEMBER, 1956

METAL FINISHING

DEVOTED EXCLUSIVELY TO METALLIC SURFACE TREATMENTS

FOUNDED 1903

JAN 3 - 1956

Bufs for All Purposes

Types, Advantages and Applications

Surface Treatment and Finishing of Light Metals

*Plating on Aluminum — Anodic Oxidation
Processes*

Barrel Finishing Equipment

Types of Barrels and Their Applications

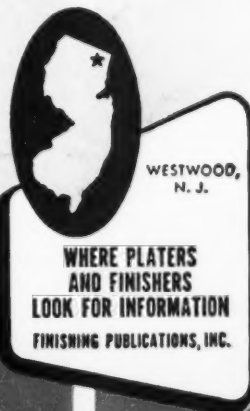
Finishing Pointers

Measuring Additions to a Bath

Science for Electroplaters

Polarization

Complete Contents Page 53



READ & PASS ON



A pause in our daily work
to extend to you
Greetings of the Season



FREDERICK GUMM

Chemical Company Inc.

538 FOREST STREET, KEARNY, N.J.

ENTHONE

Emulsion Cleaner

75



Removes Oil and Solid Dirt in SECONDS!

SIMPLE OPERATION . . . MANY ADVANTAGES

DIP . . . steel parts to be cleaned in Emulsion Cleaner 75 for only 15 seconds. This simple immersion is done at room temperature (no heating facilities required) and with no irritation of the operator's nose, throat or skin.

RINSE . . . in plain water.

DONE . . . and done *thoroughly* . . . in seconds! All heavy oil films and solid dirt have been removed from every corner and crevice . . . from slots, tapped holes and sculptured patterns.

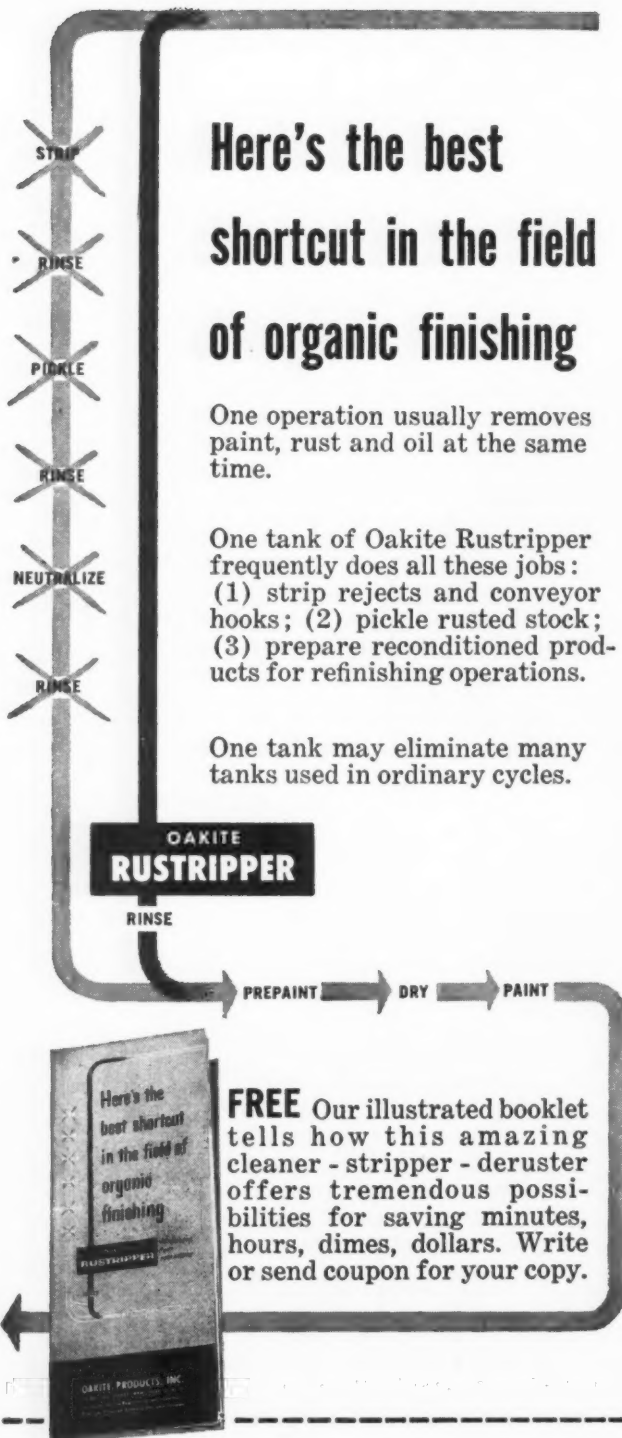
INSURE . . . smoother, brighter, more adherent electrodeposits . . . and a reduction in pitting.

WRITE FOR FREE LITERATURE ON THIS SIMPLE, FAST, SAFE . . . AND ECONOMICAL . . . METHOD OF CLEANING METALS.

Service Representatives and Stock Points in Principal Cities of
U.S.A. and Canada, Brazil, England, France, Sweden, and Germany

ENTHONE
INCORPORATED

442 ELM STREET, NEW HAVEN 11, CONNECTICUT
Metal Finishing Processes • Electroplating Chemicals

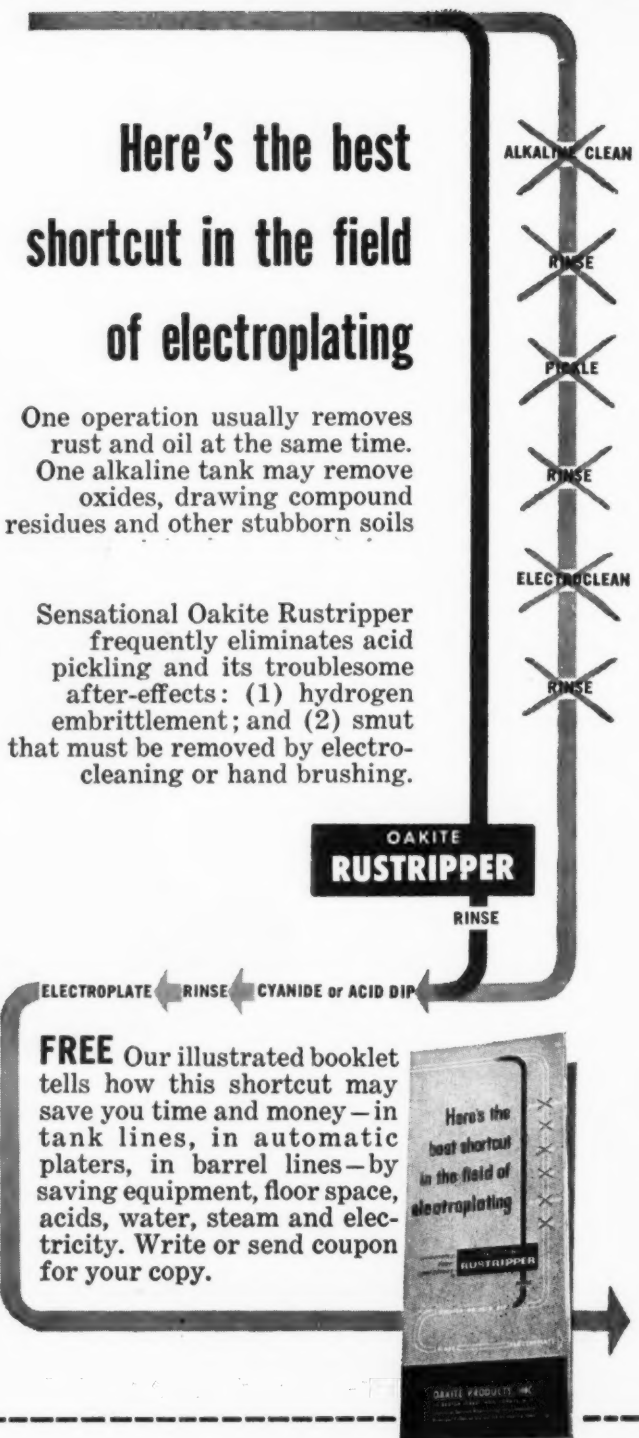


Here's the best shortcut in the field of organic finishing

One operation usually removes paint, rust and oil at the same time.

One tank of Oakite Rustripper frequently does all these jobs:
 (1) strip rejects and conveyor hooks; (2) pickle rusted stock; (3) prepare reconditioned products for refinishing operations.

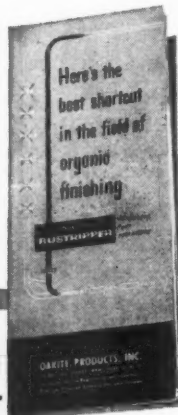
One tank may eliminate many tanks used in ordinary cycles.



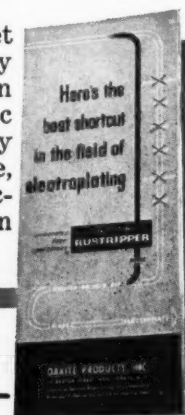
Here's the best shortcut in the field of electroplating

One operation usually removes rust and oil at the same time. One alkaline tank may remove oxides, drawing compound residues and other stubborn soils

Sensational Oakite Rustripper frequently eliminates acid pickling and its troublesome after-effects: (1) hydrogen embrittlement; and (2) smut that must be removed by electrocleaning or hand brushing.



FREE Our illustrated booklet tells how this amazing cleaner - stripper - deruster offers tremendous possibilities for saving minutes, hours, dimes, dollars. Write or send coupon for your copy.



FREE Our illustrated booklet tells how this shortcut may save you time and money—in tank lines, in automatic platers, in barrel lines—by saving equipment, floor space, acids, water, steam and electricity. Write or send coupon for your copy.

Technical Service Representatives in Principal Cities of U. S. and Canada



OAKITE PRODUCTS, INC.
 18 Rector St., New York 6, N. Y.

Send me a free copy of the booklet checked:

- ☐ "Here's the best shortcut in the field of organic finishing"
☐ "Here's the best shortcut in the field of electroplating"

NAME _____

COMPANY _____

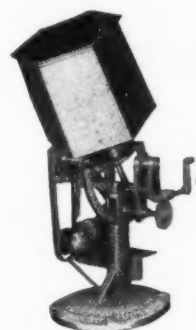
ADDRESS _____

4/Circle on Readers' Service Card

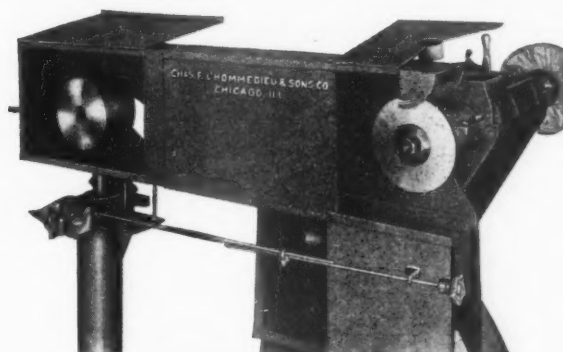
USE "RELIANCE" PRODUCTS FOR

ECONOMY : EFFICIENCY : DEPENDABILITY

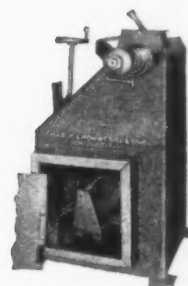
WRITE FOR FURTHER DETAILS



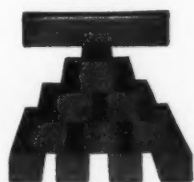
OBLIQUE
TUMBLING BARREL



BACKSTAND IDLER WITH LATHE



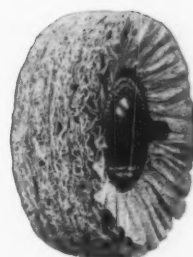
#23A
POLISHING LATHE



EXTRUDED COMPOSITIONS
STANDARD SIZE
2 x 2 x 10"



BACKSTAND IDLER



NUWAY BUFFS FOR
FAST CUTTING

Chas. F. L'Hommedieu & Sons Co.

MANUFACTURERS of
Plating and Polishing Machinery
Complete Plating Plants Installed



C. B. Little
Newark, N. J.

W. R. Shields
Detroit, Mich.

Gen. Office and Factory:

4521 Ogden Ave.

CHICAGO

Branches:

Cleveland

and

Los Angeles





News about COATINGS for METALS

Metallic Organic Decorative Protective

"Automated" chromium bath helps cut plating costs

BRIGHT NICKEL MINIMIZES PROBLEMS

To plants thinking of ways to minimize bright nickel plating problems, the Unichrome Bright Nickel process has much to recommend it. The deposits prove unusually receptive for chromium plate; they resist cracking, give excellent corrosion protection to the base metal.

Production-wise, the plating solution displays remarkable stability and reduces amount of addition agents to the bath and control problems. It has demonstrated unusually good tolerance for impurities, reducing downtime for filtration.

Pyrophosphate copper eases buffing

Deposits from Unichrome Pyrophosphate Copper can be suited to the base metal.

With one addition agent developed for Unichrome Copper, satin-finish, ductile, easily buffed deposits are produced which flow easily under the wheel, covering blemishes and speeding the job.

However, when condition of base metal permits, use of another addition agent produces a lustrous deposit which can eliminate copper-buffing entirely.

Unichrome is a trademark of Metal & Thermit Corp.



METAL & THERMIT
CORPORATION

General Offices: Rahway, New Jersey
Pittsburgh • Atlanta • Detroit
East Chicago • Los Angeles
In Canada: Metal & Thermit—United Chromium
of Canada, Limited, Rexdale, Ont.

- Bath automatically kept in optimum balance
- Chemical control greatly simplified with Unichrome SRHS® Chromium Process

In up-to-date chromium plating plants, even the chromium bath contributes to "automation" of operation. It's done by using the Unichrome SRHS® Bath.

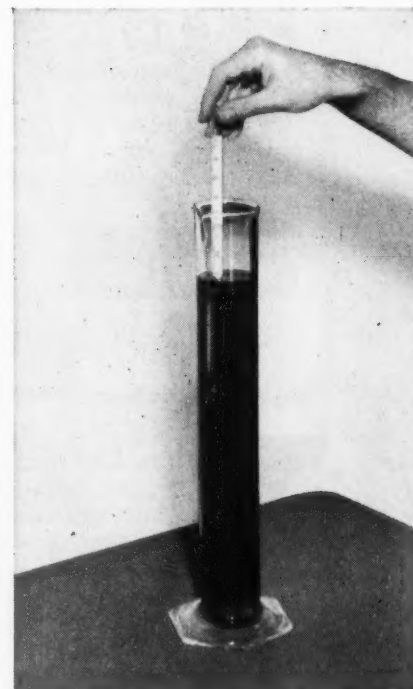
Remarkable feature of SRHS Solutions is the *self regulation* of important chemical constituents. In effect, this means *automated control*. Automatically kept in optimum balance, the bath assures good results, saves manhours and money.

OPERATION IS EASIER

Unlike plating with ordinary chromium, there's no need to make lengthy analyses of samples of the SRHS solution; no need to lose time determining additions to the bath to restore proper balance for good plating.

Instead, the unique formula of the SRHS compound permits a reserve of chemical to be available in the tank ready to dissolve automatically in the right amount needed to replace losses. A simple hydrometer reading tells when to add more SRHS Compound.

By maintaining themselves continuously in peak plating balance, the SRHS baths provide not only a more foolproof operation, but also better results.



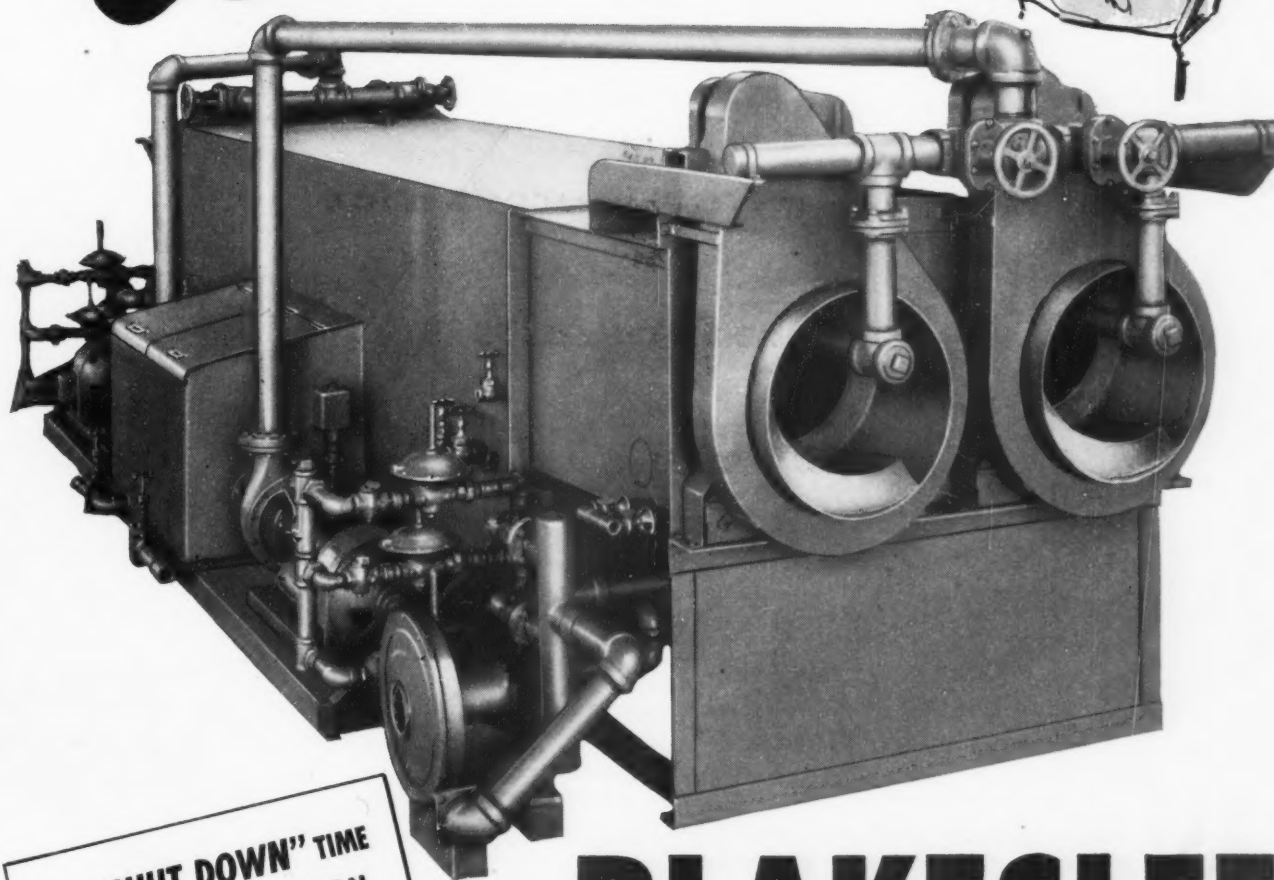
A simple hydrometer check, taken at periodic intervals, indicates when additional SRHS Compound is needed.

HOW RESULTS ARE IMPROVED

Through this *automated* control of plating balance, the numerous cost-cutting benefits of SRHS are achieved to the fullest. Plants plate up to twice as fast as with ordinary chromium . . . save on power consumption . . . gain more production capacity without extra equipment . . . and reduce the "burning" and "missing" that account for so many rejects.

For details, send for Bulletin SRHS-3, or for a Metal & Thermit engineer.

LOWER MAINTENANCE AND LABOR COSTS



**LESS "SHUT DOWN" TIME
SPEEDS UP PRODUCTION**

Shut downs are a dead loss
that can never be made up.
That's why manufacturers
throughout the world depend
on Blakeslee for uninterrupted
performance.

BLAKESLEE METAL PARTS WASHERS...

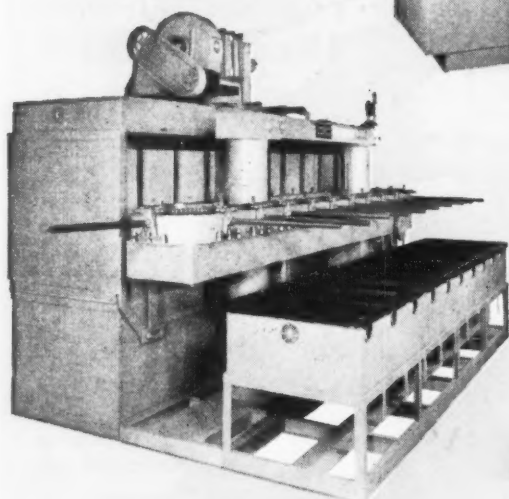
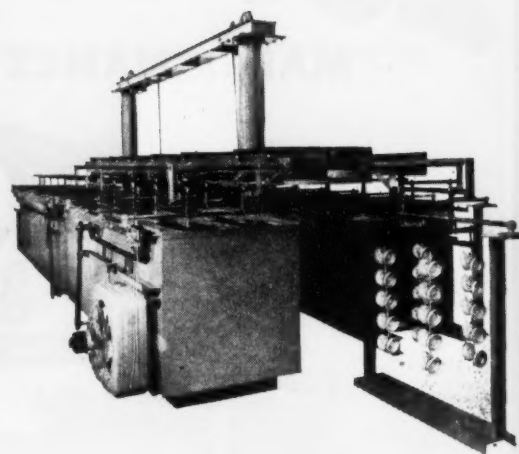
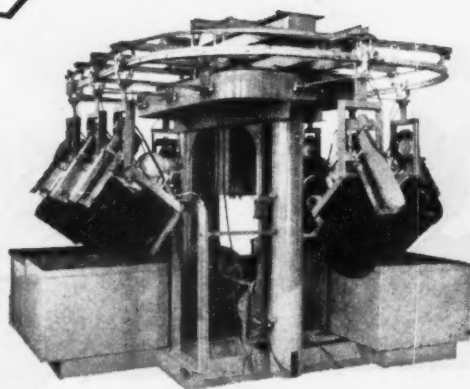
are built to last...Give real economy in production.
Many are still in use after 35 years of efficient service.
Write for complete information on BLAKESLEE
metal washing and surface treatment machines.

G. S. BLAKESLEE & CO. 1844 S. Laramie Ave., Chicago 50, Ill.

NEW YORK • LOS ANGELES • TORONTO

also Manufacturers of Blakeslee Solvent Vapor Degreasers and Blacosolv Degreasing Solvent.

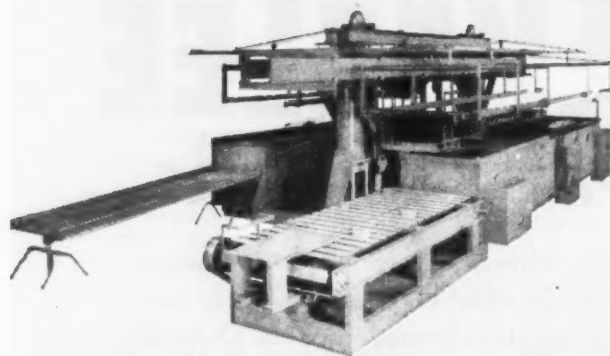
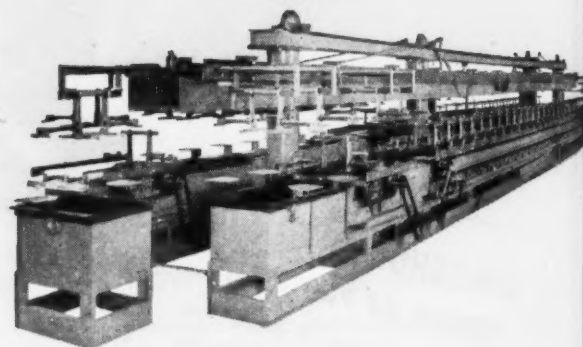
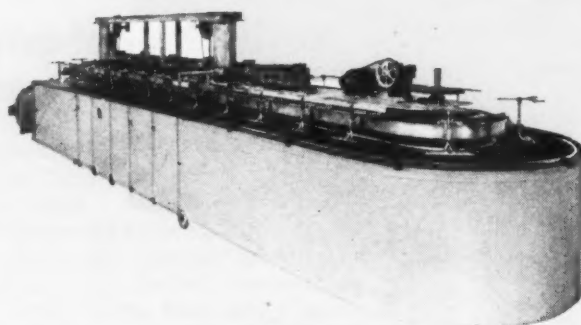
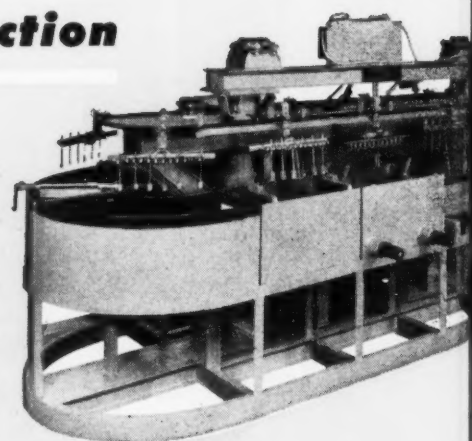
CROWN AUTOMATICS



increase production

reduce costs

improve quality

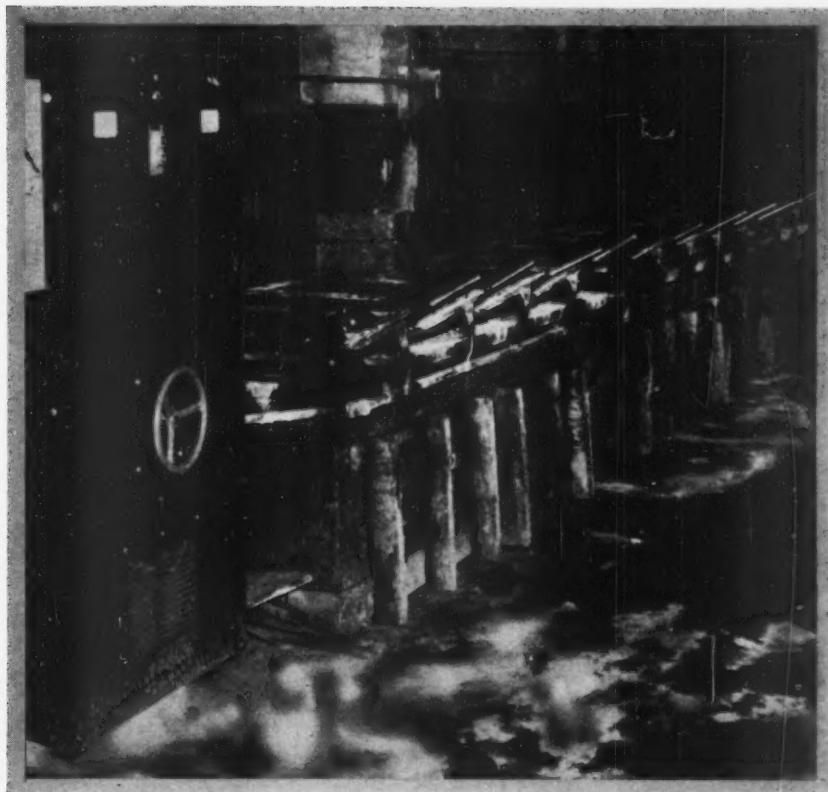


Crown Automatics are ideal for plating your barrel or racked work. Crown manufactures the widest variety of fully automatic plating machines in the industry... *there is a model to fit your needs.* Write us details of your job and production requirements.

CROWN RHEOSTAT AND SUPPLY COMPANY

3465 N. KIMBALL AVENUE • CHICAGO 18, ILLINOIS





CATHODIUM METALLIZING credits sizable saving in power cost to germanium installation

Since installing their first RAPID germanium rectifier six months ago Cathodium Metallizing of New York has credited a power cost saving of approximately \$250.00 to germanium.

Conclusive results of a comparative study between selenium and germanium rectification indicated an average saving of 40 dollars a month.

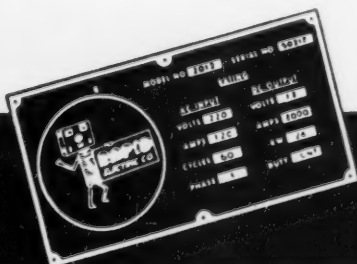
Specializing in plastic metallizing (for conductivity, durability, appearance), Cathodium Metallizing operates the 18,000 watt germanium unit at almost full load, 24 hours a day, 6 days a week.

The barrel plating operation, requiring a steady plating voltage consists of an initial copper deposit to a desired thickness. The finishing plate of gold or silver is then applied.

Here the highly desired advantages of germanium's inherent voltage stabilization and operating efficiency are most evident.

Cathodium Metallizing, like so many other firms, is pleased to announce that RAPID germanium's efficiency and low price answers their plating needs.

Make sure YOUR next rectifier wears a RAPID GERMANIUM nameplate.



THE NAMEPLATE THAT MEANS *"More Power to You!"*

RAPID ELECTRIC COMPANY

2889 Middletown Road • New York 61, N. Y. • Phone: Talmadge 8-2200



ELECTROPLATERS:
"Blast" off heaviest smuts
with PENNSALT ELECTROCLEANER K-8

Pave the way to a smooth, bright plate with minimum rejects—use Pennsalt Cleaner K-8*, the KING OF ELECTROCLEANERS.

The high conductivity of K-8 lets high currents flow at moderate voltages, produces a strong electrolytic "scrubbing" action that removes the most stubborn heat-treating smuts, impacted mill oils, and drawing compounds. A new combination of surfactants and balanced alkalis in K-8 gives you cleaner steel or copper for a consistently better plate. And, once removed, soils are prevented from redepositing; suspended by the K-8 solution, they're easily rinsed off even in hard water.

Remember—where other cleaners fail, Pennsalt Electrocleaner K-8 cleans deep and sure. TRY K-8 IN YOUR CYCLE. Ask the Pennsalt man for a demonstration, or write Metal Processing Dept. 234, Pennsylvania Salt Manufacturing Company. East: Three Penn Center Plaza, Philadelphia 2, Pa.; West: 2020 Milvia Street, Berkeley 4, Calif. In Canada: Pennsalt Chemicals of Canada, Hamilton, Ontario.

*PENNSALT K-8 IS A TRADEMARK OF PENNSYLVANIA SALT MFG. CO.

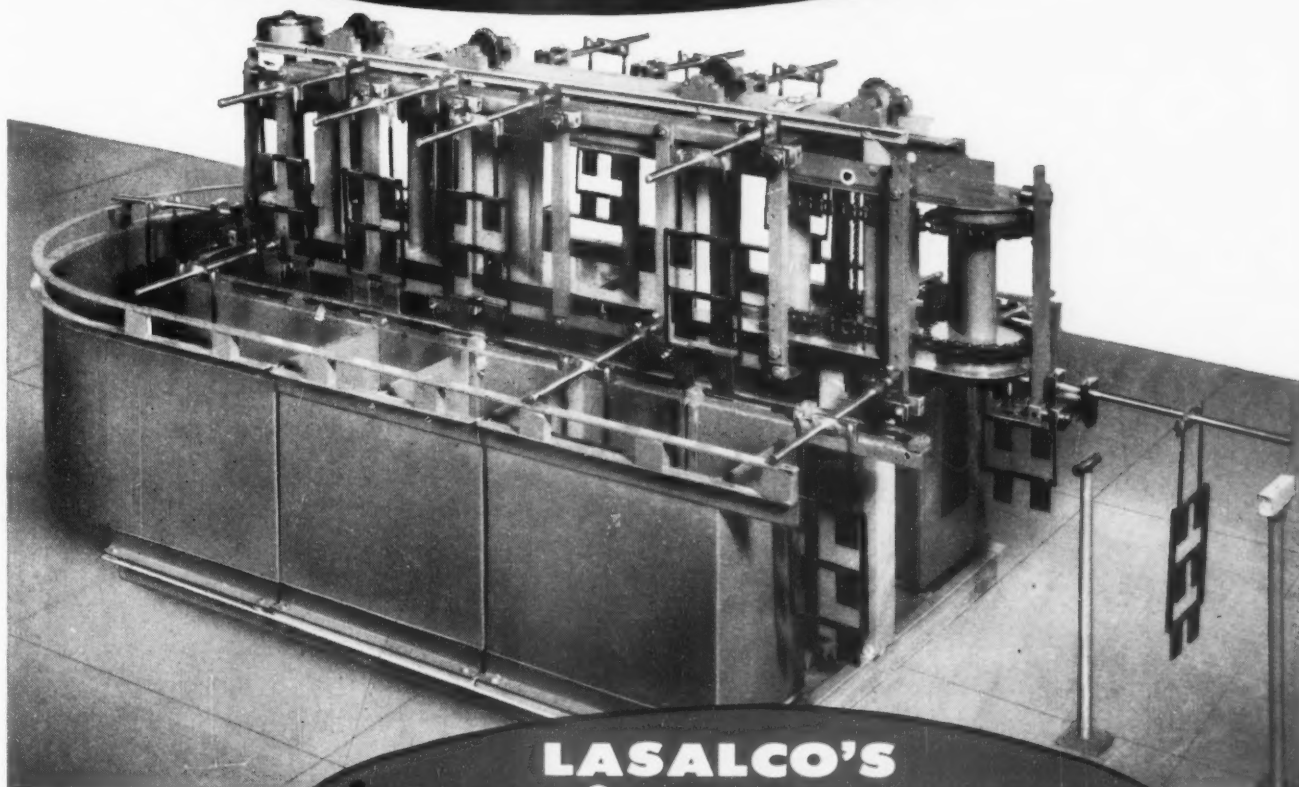


**Pennsalt
Chemicals**

Metal Cleaners • Phosphate Coatings • Cold-Working Lubricants

A B E T T E R S T A R T F O R Y O U R F I N I S H

**Most versatile of all fully automatic
plating and anodizing machines**



New! LASALCO'S Cycleflex

- Cycle changing requires no costly overhaul or rebuilding. Only the positions of pick-up heads need be moved, plus minor tank partition changes.
- New, simple electro-mechanical control and safety device eliminates all possibility of conveyor failure . . . makes it impossible to push racks into side of tank . . . prevents load from dropping if power fails during work transfer.
- Unusually low headroom required because no elevating mechanism operates above rack carrier.
- Self-cleaning heavy duty contacts have positive 3-point connection . . . need practically no attention.
- Easily removable rack carriers leave tank surfaces clear . . . an advantage in servicing and in manual plating of large pieces.
- Automatic loading and unloading of parts from standard double-spine racks is available . . . parts can be automatically unloaded while racks stay on machine.

Hydraulic operation, standard;
pneumatic operation, optional.

Write For Brochure

LASALCO, INC.

HOME OFFICE: 2820 LaSalle St. • St. Louis 4, Mo. • PRospect 1-2990
IN TEXAS: 1113 Perry Road • Irving (Dallas), Texas • BLAckburn 3-4921



...score one

for Chromium!

score one

Deadly on low-flying enemy planes, the Army's electronically directed "Skysweeper" is but one of the many artillery weapons in America's defense arsenal having chromium-plated bores for maximum accuracy and wear resistance.

Here, as elsewhere, you will always find Mutual Chromium Chemicals in the front lines of our battle with corrosion and friction. Send for literature covering your field of interest.

U. S. Army Photograph



MUTUAL

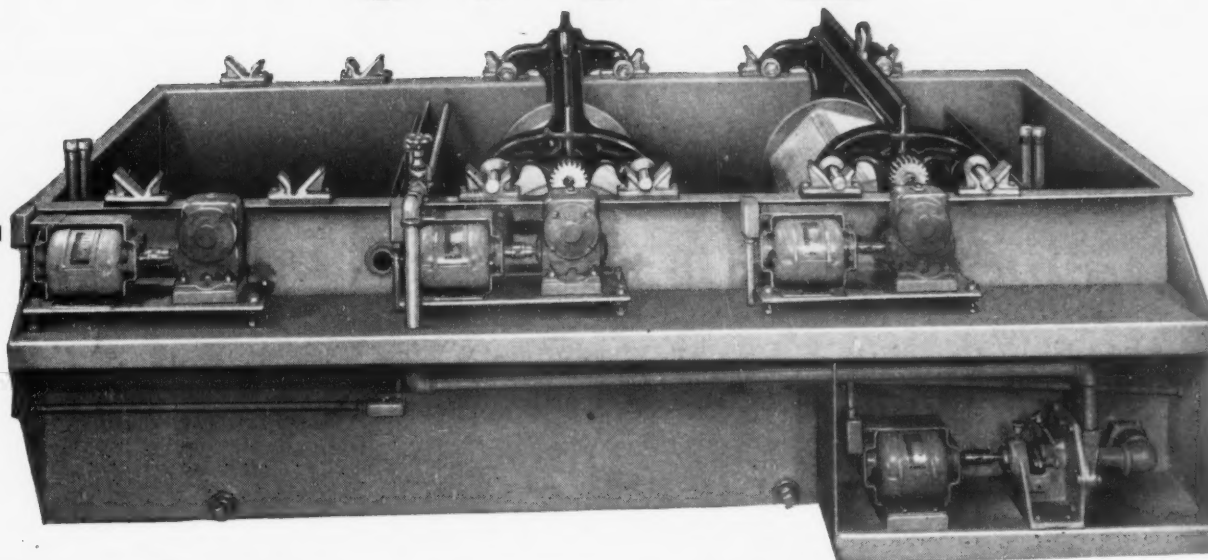
MUTUAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION

99 PARK AVENUE • NEW YORK 16, N. Y.



STUTZ



Alkali Cleaning and Rinsing Units

*Also for De-scaling and Rust Removal
for heavy duty - high speed Production*

Stutz design in single or multiple units with or without rinsing compartment. Solution circulating pump for rapid elimination of surface grease into trap from which complete removal made by draining of trap compartment daily.

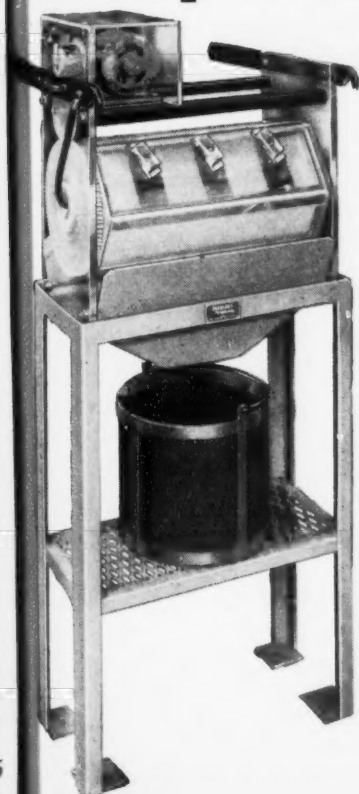
Rotation of work in cylinders together with solution agitation of pump provides complete cleaning in a single operation.

Cylinder drive and pump motors are 1/3 h.p. 440-220-3-60 with heater type motor control switches. Plate or pipe coils installed.

With this type of equipment, vapor degreasing is not required.

Can also be furnished for electrolytic cleaning.

For de-scaling and rust removal above units require periodic reverse current.



STUTZ Portable Plating Barrels

- The Stutz Portable Barrel is made in 2 standard sizes with cylinders having inside dimensions of 6" x 12" and 8" x 18", I.D., and smaller upon application. Standard openings are 3/32". Smaller or larger openings can be furnished as required.
- Baskets in perforated metals or wire mesh.
- Load/Unload Stand for convenient and fast handling or work load.

Write for prices and catalog

GEO. A. STUTZ

4430 CARROLL AVENUE

MANUFACTURING
COMPANY

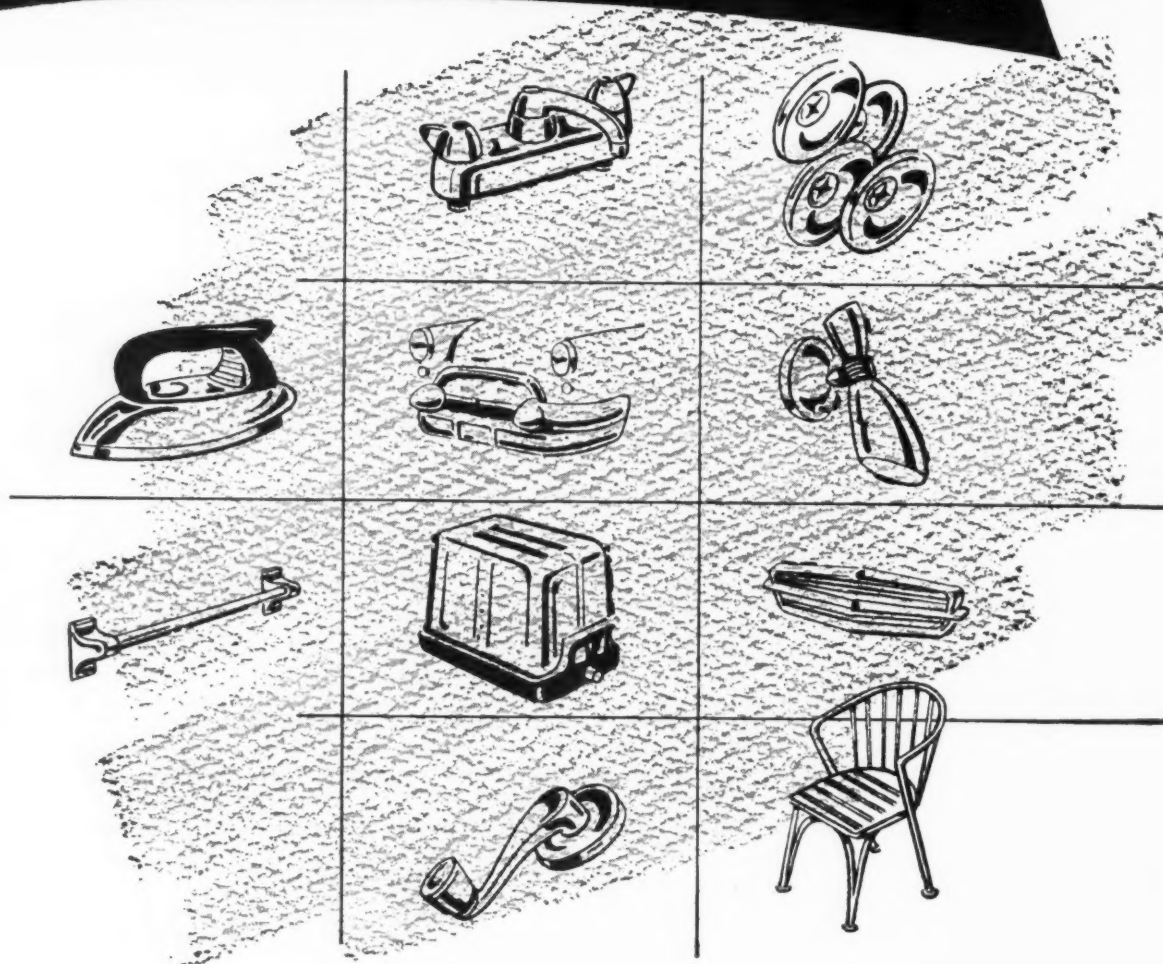
CHICAGO 24, ILLINOIS

"Complete metal finishing equipment and supplies"

13/Circle on Readers' Service Card

HARSHAW Nubrite

**long, bright nickel plating
operation without treatment**



Other outstanding advantages are:

BRIGHT OVER WIDE RANGE

from a few amperes/ft.²
to well over 100 amperes/ft.²

HIGH TOLERANCE to common impurities

HIGHLY RECEPTIVE to chrome

EXCELLENT LEVELING

BETTER BRIGHTNESS with thinner deposits.

SIMPLE OPERATION and CONTROL

Plates brightly from 120°F to 155°F.

pH can vary over a wide range

Liquid addition agents.

**REMAINS DUCTILE AFTER LONG
OPERATION**

For additional information contact the Harshaw office nearest you.

THE HARSHAW CHEMICAL CO.

1945 East 97th Street • Cleveland 6, Ohio

Chicago 32, Ill. • Cincinnati 13, Ohio • Cleveland 6, Ohio • Houston 11, Texas

Los Angeles 22, Calif. • Detroit 28, Mich. • Philadelphia 48, Penna.

Pittsburgh 22, Penna. • Hastings-On-Hudson 6, N. Y.

NOXIOUS - CORROSIVE - ABRASIVE FUMES,

MIST AND DUST REMOVED MORE EFFICIENTLY,

MORE ECONOMICALLY BY THE...

Cyclonaire- **FUME WASHER**



If your plant has an air pollution problem it can probably be solved in less time—with less trouble—and for less expense than you realize. We're speaking of course, of the Cyclonaire . . . a new and highly effective departure from bulky, old fashioned "custom built" fume scrubbers. The Cyclonaire removes up to 99.9% of many gases in concentrations of 1% or less, and safely handles corrosive fumes in low concentrations. Yet for all its efficiency, it is much smaller in size (and less expensive), with relatively low power and water requirements. Since it requires little floor space it can usually be strategically located inside the plant. Installation can be handled by two men in four hours, or it can be disassembled and relocated in a comparably short time. It is made of steel in easily assembled flanged sections, and protected from corrosion by a 3/32" Tygon Lining on interior surfaces. Outside surfaces are protected by Tygon ATD Hot Spray Paint.

The Cyclonaire owes its superior efficiency in large part to its Intalox Saddle Tower Packing which: 1) provide more available gas liquid contact area, hence *more efficient scrubbing action*; and 2) insure greater randomness of packing with more void space through the bed, permitting *higher c.f.m. rates*. The Cyclonaire is sold as a "package" unit, complete with motor and Intalox Saddle Tower Packing. It is available in four standard models: 750, 1650, 3500 and 6000 c.f.m. (larger sizes on special order). Moreover, many variations are possible to meet virtually every requirement. For example: higher volumes can be handled by two units in parallel, or complete extra units can be strategically located throughout the plant. For total fume removal, additional packed sections are easily added, or two complete units may be used in series. For spray or dust elimination only, one or two packed sections may be omitted or packing volume reduced. Recycling equipment is also available for water or absorbent chemical liquids. These and many other variations can be quickly made at any time, using standard Cyclonaire components. Little or no involved engineering — and no special fabricating — is required in the majority of cases. But get the complete story . . .



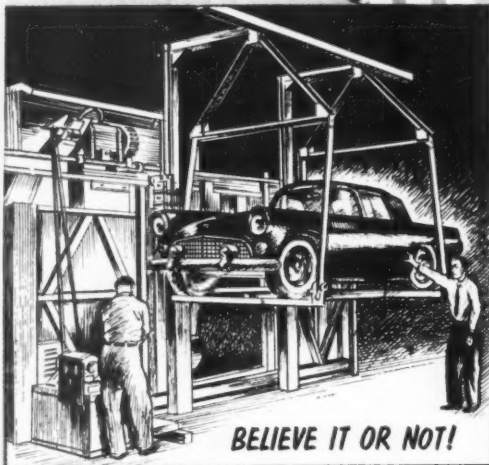
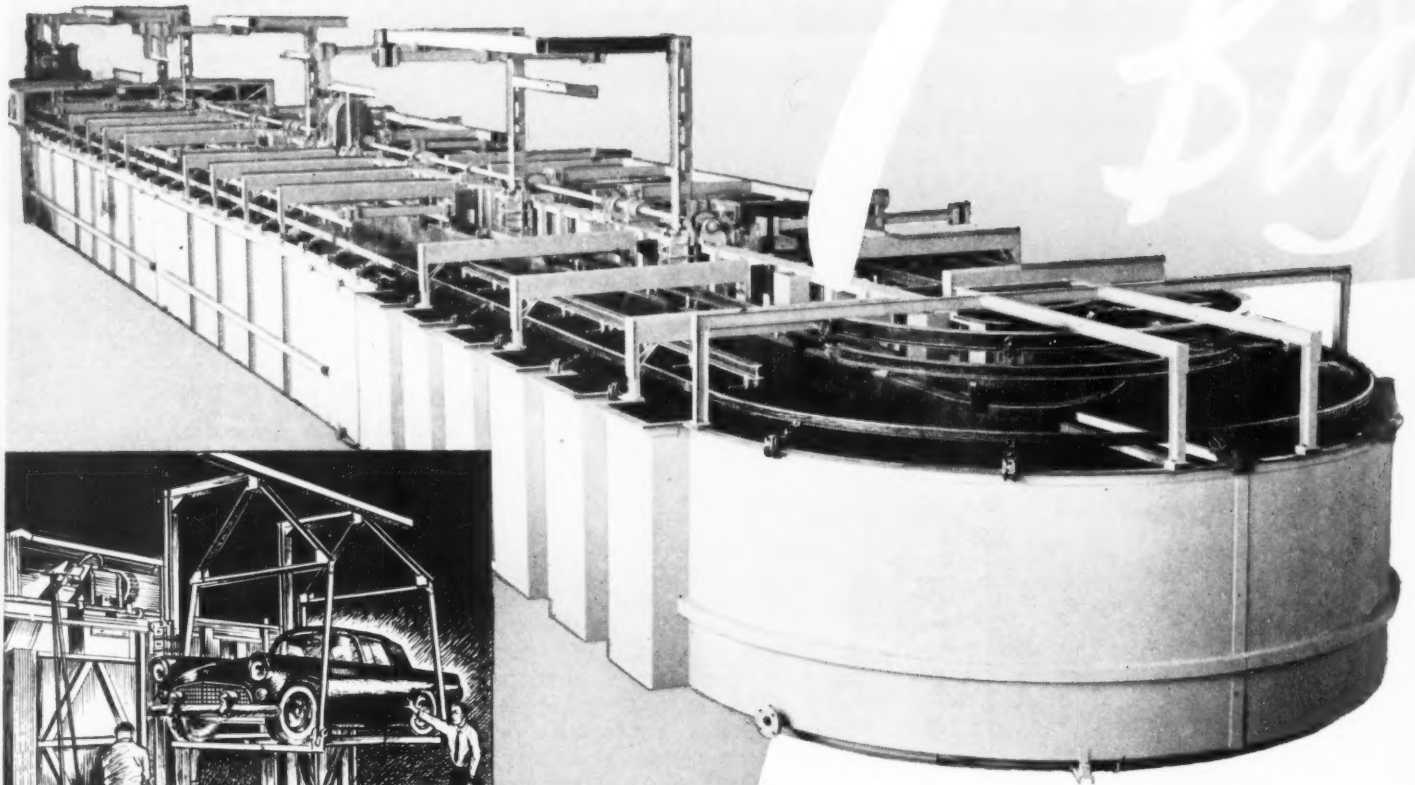
PROCESS
EQUIPMENT
DIVISION

U. S. STONEWARE
AKRON 9, OHIO

250-E

Write for Bulletin FW-5, which presents complete, illustrated technical data.

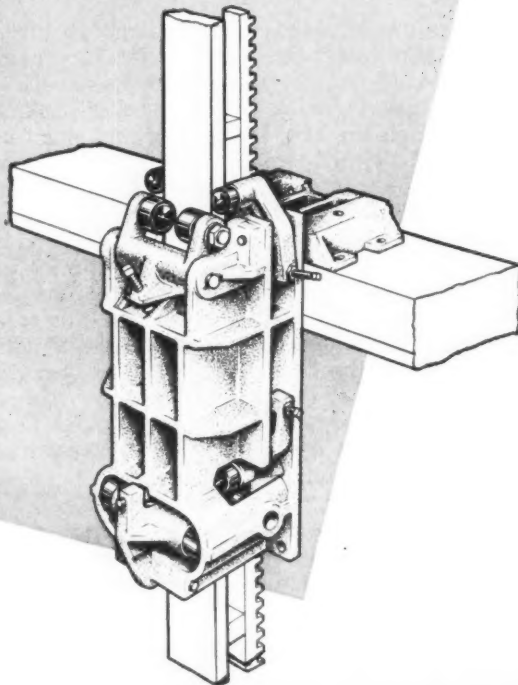
This 113' pre-enameling machine was running (dry cycling) four days after delivery! Capacity is 100 100-lb. racks per hour. Overall height of arms is only 13'.



BELIEVE IT OR NOT!

The Wagner Automatic Plating Machine Lifts 3200-pound Ford Thunderbird easily!

Typical pre-assembled single station elevator housing ready for installation over jig-drilled holes in main carriage. Note adjustable roller brackets.



- ✓ Increased Load Capacity
- ✓ 100% User Adjustability
- ✓ Simplified Installation
- ✓ Reduced Maintenance
- ✓ Practical Flexibility
- ✓ Improved Plating Quality
- ✓ Lower Production Costs

MANUFACTURERS AND PROCESSORS OF ALL METAL-FINISHING CHE

Chicago • Indianapolis • Cincinnati • Rochester, New York •
418 MIDLAND AVE., DETROIT M

Advantages!

IN THIS WAGNER STANDARD PRECISION AUTOMATIC!

Of course, you don't use your plating machine as a car hoist. But this proof of the dynamic lift capacity of the precision Wagner Automatic means that deflection under normal loads is minimum. Excessive strain on alignment mechanisms is eliminated, wear and downtime reduced to the vanishing point. Precision adjustments of critical transfer members can be made by untrained personnel—including the main lift boom, carrier lift angle assemblies and carrier rail support brackets. Maintenance is easy, as standard gear racks and pinions are used throughout the entire elevator mechanism, (capacity can be increased 50% by substituting our heavy duty rack). Positive lubrication is provided to each hardened roller—or central

lubrication may be installed, at low cost.

Here's how we cut costs of installation, servicing—even later alterations. All details are interchangeable, precision drilled and machined, pre-assembled. Machines may be lengthened or shortened for long term production changes; parts and entire assemblies, even sections, may be replaced. Every part is drilled, reamed, tapped and milled in special co-ordinated fixtures; sections are assembled in giant jigs and are designed for fool-proof self-aligning. A single hydraulic power unit interconnected to two hydromotors with micro adjustment of acceleration and deceleration permits work carriers to be lifted, transferred and deposited gently without loss of parts.

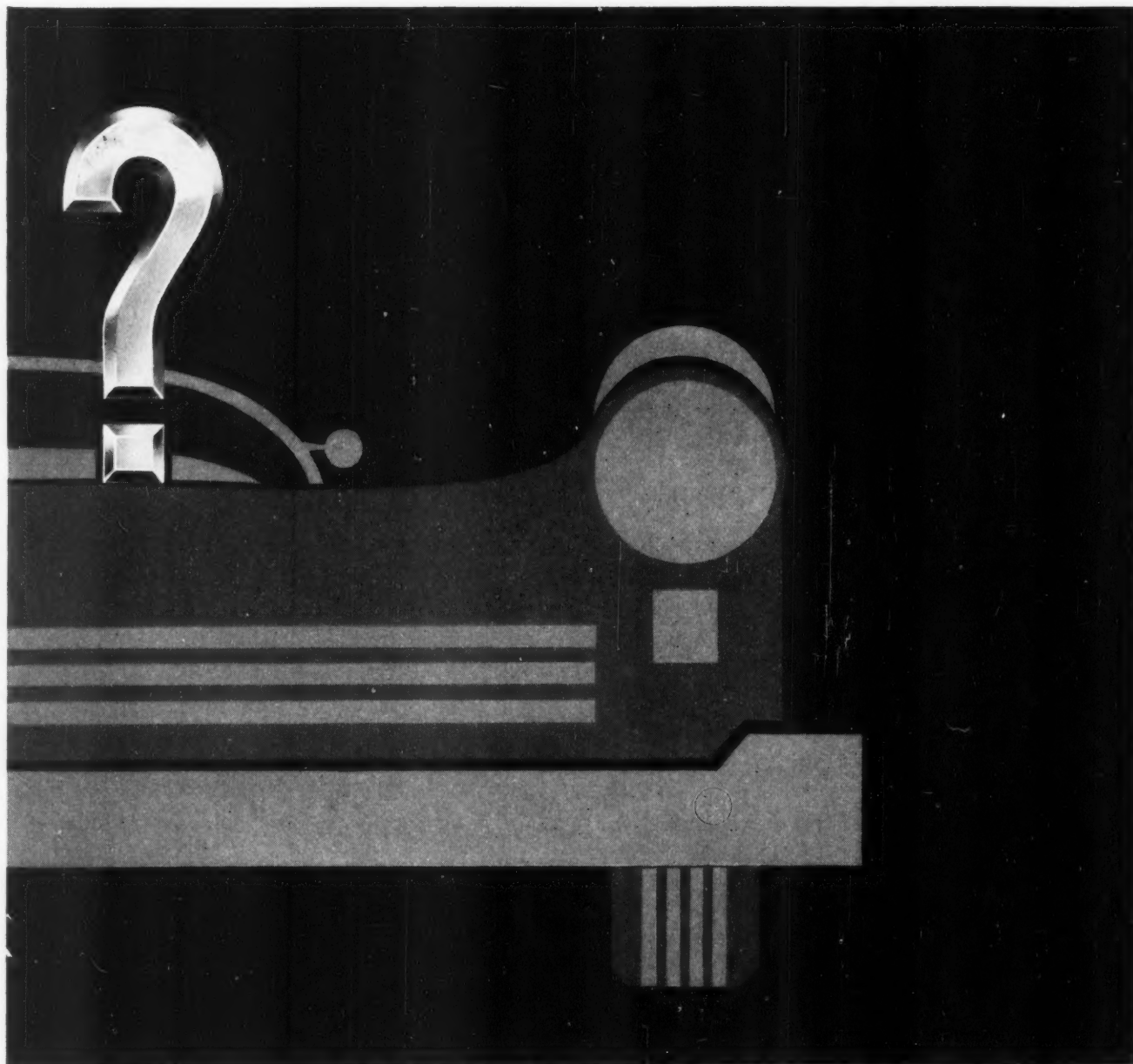
This revolutionary, precision electroplating machine is a big subject. Please send for our technical bulletin and learn all the facts—or call our representative in your area. He'll study your problems and assist in every way to achieve better plating at lower costs.

ING CHEMICALS, ANODES, AND EQUIPMENT

Cleveland
M I C H I G A N

Grand Rapids





Grill Diamond's service department on chrome plating

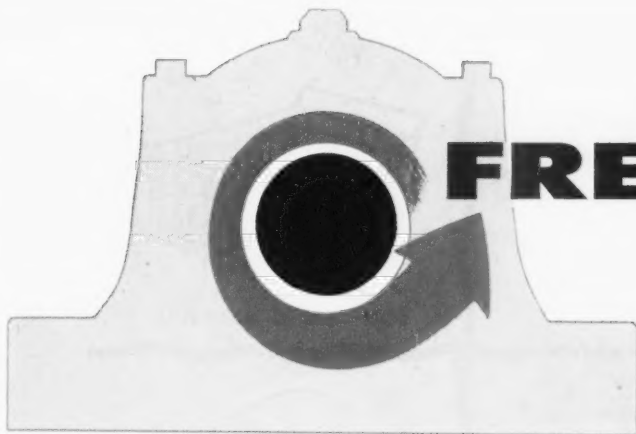
Call in DIAMOND technical specialists when you run into a chrome-plating problem. These experienced men work only on customers' questions. They deliver complete, profit-making answers. Their service is free.

In making chromic acid, DIAMOND controls quality through every step. DIAMOND experience begins with importing the chrome ore and making the soda ash. It includes production and delivery . . . even standing by your side, if you wish, to help you get top-quality plating results at low cost.

DIAMOND facilities—two chromic acid plants and nine warehouses and sales offices across the country—assure you uninterrupted service from a dependable source of supply. DIAMOND ALKALI COMPANY, 300 Union Commerce Building, Cleveland 14, Ohio.



**Diamond
Chromic Acid**



FREE RIDE...

to give you the most
low-voltage power
for your money

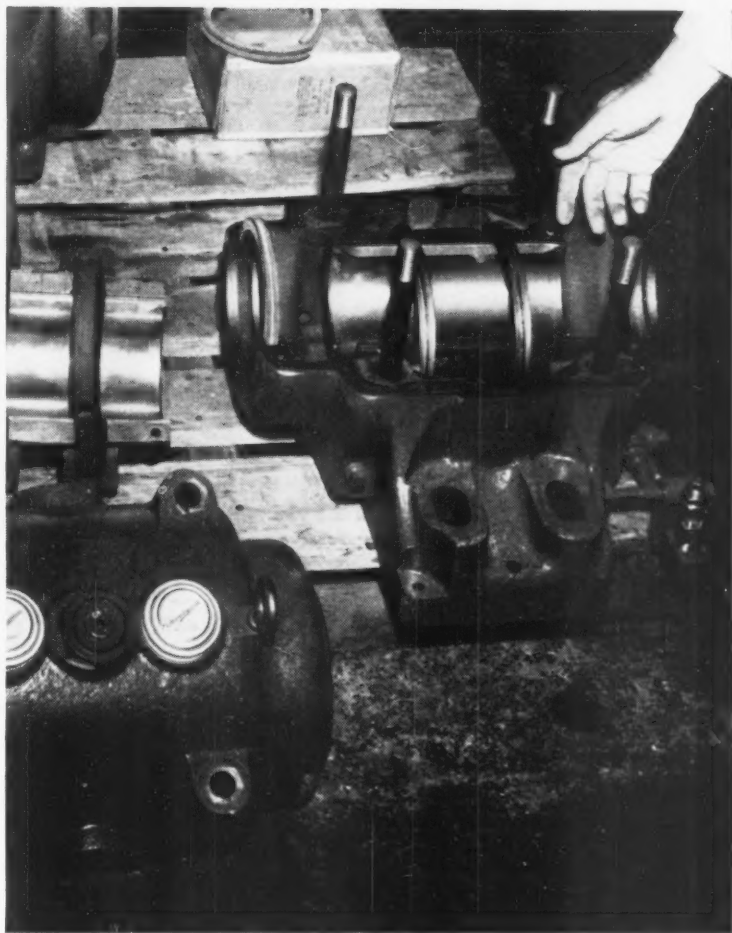
Chandeysson

SELF-ALIGNING BEARINGS ELIMINATE A MAJOR CAUSE OF FRICTION

You always know that the big, rugged shaft of a Chandeysson Motor Generator is exactly in line with its bearings. Special "self-aligning" bearings automatically compensate for normal deficiencies in foundation level or foundation settling. Inside the pillow block, the bearing liner "rides" in a machined pocket. For added freedom from friction, patented oil rings provide plenty of lubrication along the entire journal.

Advanced ideas such as this are always incorporated in Chandeysson Motor Generators. Unified responsibility for the manufacture of every component... from selected raw materials to the finished product... is in the hands of skilled men with decades of experience in building low-voltage generators. Our aim in engineering is to *prevent* design defects... rather than to correct for them. This is why more and more "Industry Leaders Choose Chandeysson!"

MAKE US PROVE to you that a Chandeysson Motor Generator set is your most economical and dependable source of low-voltage dc current. Mail this coupon today...



CHANDEYSSON ELECTRIC COMPANY
4074 Bingham Avenue, St. Louis 16, Mo.

Please send bulletin D-102

Name.....Title.....

Company.....

Address.....

City.....Zone.....State.....

CHANDEYSSON ELECTRIC COMPANY

- 4074 Bingham Avenue, St. Louis 16, Mo.

CHA-85



AMAZING TENSILE STRENGTH



PERMANENT FLEXIBILITY



CONTINUOUS ADHESION



RUGGED SCUFF RESISTANCE



POSITIVE INSULATION



DURABLE PROTECTION

When...

THEY'RE MICCROSOL COATED

They Meet the Highest Industrial Standards

MICCROSOL E-1003 Heat-Cured Rack Coating is a 100% solids, non-evaporating material that produces a smooth, tough, leather-like coating which will often outlast the rack. Exceptional adhesion is achieved through the use of our primers.

In addition to the outstanding characteristics listed above, tests for abrasion and resistance to all commonly used plating solutions, acids, and caustics show superior performance in comparison to similar products. MICCROSOL E-1003 has proven to excel as a coating for materials-handling equipment, baskets, hangers, and a wide variety of plating equipment parts.

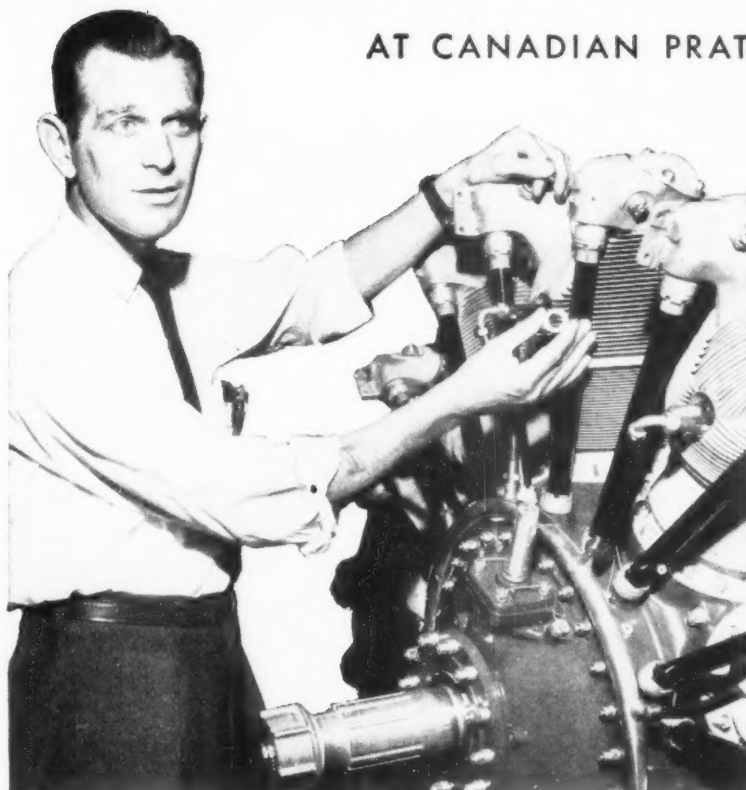
MICCROSOL E-1003 has an exceptionally high gloss, allowing free drainage, and no solution carry-over.

We will be pleased to help you with your coating problems. Send us full particulars.



MICHIGAN CHROME
and Chemical Company

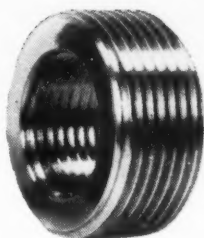
8613 Grinnell Avenue • Detroit 13, Michigan



AT CANADIAN PRATT AND WHITNEY AIRCRAFT...

ALMCO barrel finishing **SAVES 97%** on deburring and finishing of spark plug bushings

◀ **CUTS DEBURRING AND FINISHING COSTS \$2,430**
— Threaded spark plug bushings used in famous Pratt & Whitney aircraft engines will be deburred and finished for \$2,430 less this year with Almco equipment and processes. Maurice Harrison, Supervisor of Process Planning, shows the small part on which this savings will be made.



● **SAVES .10125 ON EACH BUSHING**—Deburring and finishing threaded spark plug bushings like the one shown at the left, formerly cost \$104.20 per thousand when CP & W used speed lathes, portable power tools and other hand methods.

After installing two ALMCO DB-200 Supersheen units, records showed a cost cut of 97%. This equipment turns out 1,000 bushings in 45 minutes, releases grinders and finishers to other duties. Cost reports showed:

\$104.20 cost per thousand with power tools.
2.95 cost per thousand with 2 ALMCO barrels.
\$101.25 Savings per thousand pieces.

This year CP & W will process 24,000 spark plug bushings, with a total savings of \$2,430 on this one part alone.

PRACTICALLY ELIMINATES REJECTS—Before installing controlled-type barrel finishing, parts inspectors returned for re-work an average of 125 bushings out of every 1,000 (12½%). With Almco Supersheen equipment and processes, these parts are now finished to a degree of uniformity that is virtually free of rejects.

ALMCO

DIVISION OF QUEEN STOVE WORKS, INC.

412 Marshall Street • Albert Lea, Minnesota

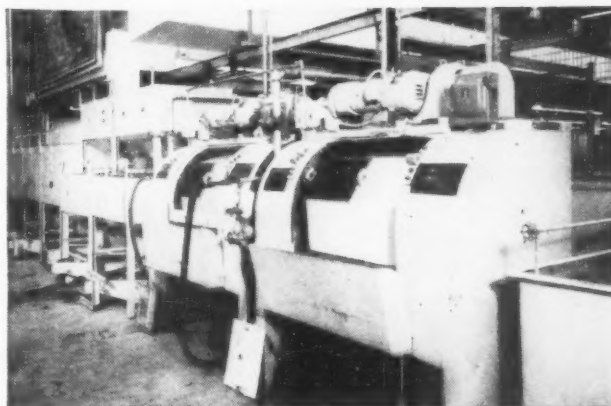
Sales and Engineering Offices in Chicago, Detroit, Los Angeles, Newark, New Haven, Philadelphia and London, England

DESIGNED FOR MANY METAL FINISHING OPERATIONS—In addition to deburring and finishing, ALMCO equipment and processes are used for descaling, degreasing, grinding, burnishing, work-hardening, rust-inhibiting, polishing, etc.

ALMCO has facilities throughout the United States for running sample parts. Write us on your letterhead for the address of an Almco sample processing laboratory or branch office in your area. Your sample, with your specifications, will be handled promptly. You'll get a complete report on where you can save deburring and finishing costs, how you can improve product quality and appearance, and what method and unit is best for your operation. Or, if you prefer, ask an Almco sales engineer to call you.

**SEND FOR FREE
52-PAGE BOOK**

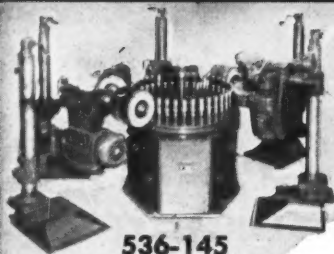
Full of facts and processes on barrel finishing. Includes detailed cost chart on finishing of typical parts. Send for your copy today.



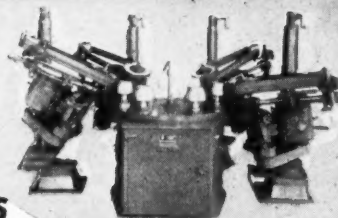
Two Model DB-200 Almco machines, using Supersheen bonded abrasive chips and compounds, deburr and polish 1,000 spark plug bushings in 45 minutes at Canadian Pratt and Whitney.

ACME *Rotary Automatics*

**... cut costs on
production finishing**

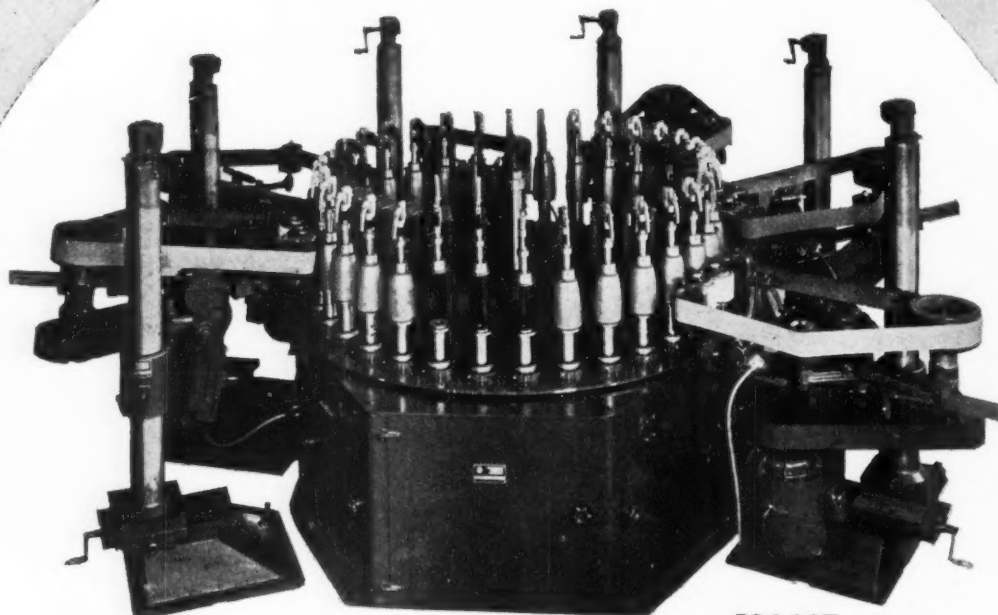


536-145



512-9-2

**ROTARY TABLES
ARE AVAILABLE IN SIZES
UP TO 24 FT. DIAMETER**

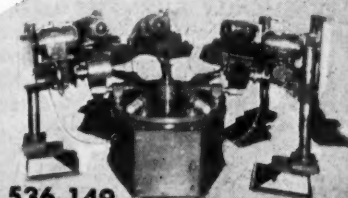
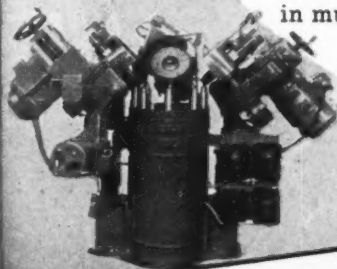


534-337

ACME 8 FT. *Combination Type* ROTARY AUTOMATIC

● This machine can be readily changed from a 32 spindle continuous rotary automatic to an 8 station indexing rotary automatic by simple hand crank adjustment. Various types of ACME adjustable floating head polishing and buffing lathes are used including belt arm attachments on buffing heads, utilizing the same heads for buffing or belt operations. Spindle arrangements are available in multiples of 8.

Rotary Catalog on Request.



536-149

RECOMMENDATIONS and QUOTATIONS . . . will be offered on receipt of blue prints or preferably finished and unfinished parts you contemplate finishing, together with details of your present finishing operations and production requirements.



ACME Manufacturing Co.

Builders 1400 E. 9 MILE RD., DETROIT 20 (Ferndale) MICH.
OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR NEARLY HALF A CENTURY

A NEW ACHIEVEMENT IN SPRAY-CLEANING EFFICIENCY

JET CLEANERS

The JET series was developed to fill the need for economical, efficient, low-foaming spray cleaners to be used on zinc, copper, brass or steel.

- ▶ JET CLEANERS step-up the efficiency of your spray cleaning equipment.
- ▶ Reduce overflow loss with new low-foaming formula (no silicones or troublesome chemicals), permitting wider range of concentration.
- ▶ Carry heavier dirt load without redeposition.
- ▶ Remove all types of soil.
- ▶ Are harmless to rack coatings and equipment.
- ▶ Non-toxic, dust-free, non-caking.
- ▶ Offer better results at lower cost.

Remember — YOUR COST
PER FINISHED ARTICLE IS THE
TRUE COST OF YOUR CLEANER



Let the Northwest Cleaning Specialist explain JET CLEANERS' advantages in your production.

NORTHWEST CHEMICAL CO.

9310 ROSELAWN

DETROIT 4, MICH.

pioneers in pH cleaning control

serving you since '32



Always buying
at top prices

*Want fast action?
Ride with us!*

Ship us your

NICKEL PLATER'S SCRAP

For prompt quotation send us
a 5-lb. representative sample
of your accumulation.

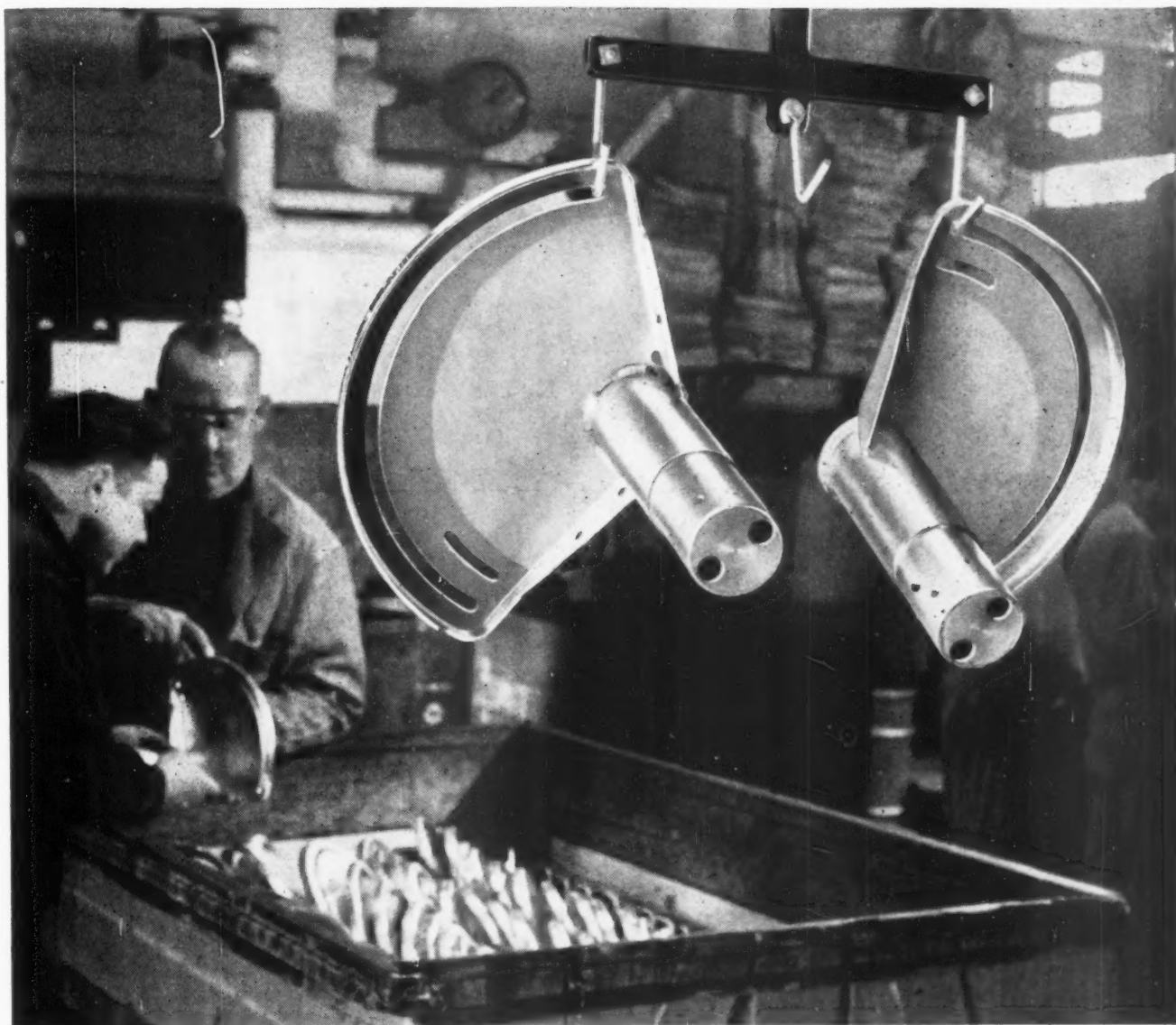
Invoice us for sample or we will
pay on basis of laboratory analysis.

Phone . Wire . Write

Stainless Steel Corp. of America

OHIO EDISON BLDG. YOUNGSTOWN 3, OHIO

Riverside 4-4123



Thorough stripping power of caustic solution quickly provides clean surface for this smooth cadmium finish.

STRIPPED CLEAN FOR LESS WITH DOW CAUSTIC FLAKE

*Easy to get, easy to use: anhydrous caustic
flake keeps costs low, alkalinity high*

Here's unsurpassed alkaline stripping power . . . free-flowing, uniform caustic flake! Here's unsurpassed assurance of supply . . . Dow multi-plant production: Midland, Michigan; Freeport, Texas; Pittsburg, California.

And here's unsurpassed dependability in delivery . . . the extensive Dow distribution network of terminals and regional stock points. Better stripping, lowest cost, full supply, prompt delivery . . . *four good reasons* for ordering Dow caustic flake. THE DOW CHEMICAL COMPANY, Dept. AL 754J-2, Midland, Michigan.

you can depend on DOW CHEMICALS

DOW

ALWAYS FINISHES FIRST

— and lets buffs live up to
200% longer



fast cutting, easy cleaning with

Liquimatic

the perfect liquid compound[®]
for all metal finishing

It's a fact—Liquimatic's continual lubrication lengthens buff life up to 200%. It's not hard to figure that such a healthy saving on buffs soon pays for a complete Liquimatic Application System—a system that *continues* to save you money in all phases of your buffing and polishing operations.

Liquimatic saves on production costs because it's completely automatic. An electrically timed system feeds Liquimatic Compound to the buff in exactly the right amount to produce the exact rate of cut you need. There's no compound wasted, no nubbin problem. No hand application, no changing bars, either—can you see any savings here in your buffing room?

Check the other features of Liquimatic Liquid Buffing Compound... then write today for your free copy of Liquimatic's folder that tells the whole cost-saving story of Liquimatic in *your* buffing room.

Liquimatic ...

gives more buff mileage

These additional Liquimatic features mean real savings in terms of time, money, safety—

- completely automatic • fast cutting • lower compound cost • easy cleaning • adhesive slow-wearing buff face • non-settling • high flash point • long storage life • sprayable viscosity

PLATEMANSHIP

Your H-VW-M combination—of the just modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

HANSON-VAN WINKLE-MUNNING COMPANY

Main Office and Plant, Matawan, New Jersey

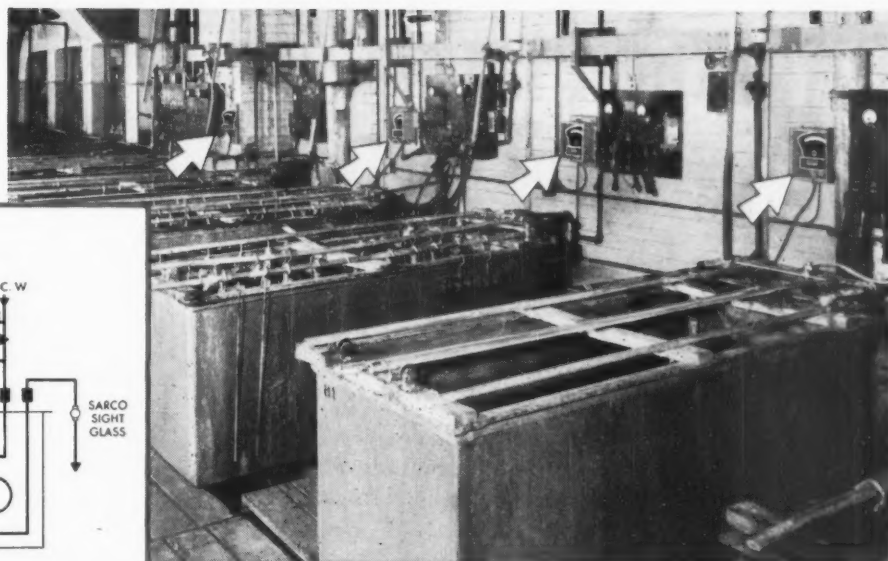
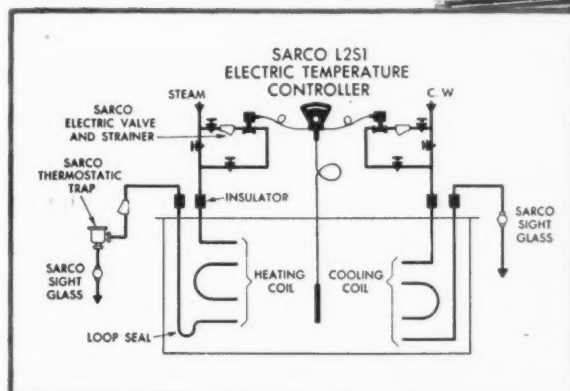
J. C. Miller Division, Main Office and Plant, Grand Rapids, Mich.

SALES OFFICES: Anderson (Ind.) • Baltimore • Beloit (Wisc.) • Boston
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H-VW-M

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES



▲ Over 30 Sarco Electric Temperature Controllers help maintain high quality plating at Ronson Art Metal Works, Inc., Newark, N. J. Controllers are used on chrome, nickel, copper, silver and gold plating tanks.

Why RONSON relies on Sarco Temperature Controllers for high quality plating

RONSON, manufacturer of the "World's Greatest Lighter," knows that high quality plating depends upon close control of many variables, the most important of which is the bath temperature.

They know that erratic bath temperatures usually result in costly rejects, wasted man hours, and dissociation of expensive solutions.

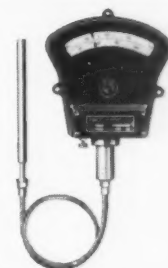
In 1948, Ronson made trial installations using Sarco LSI Electric Temperature Controllers and other competitive devices. The Sarco LSI's

proved superior on all counts: dependability, cost, ease of installation, and maintenance.

As a result, LSI's are now standard equipment at Ronson. Mr. J. Rembecki, metallurgical engineer, reports that Sarco LSI's have given trouble-free service for over five years.

For information on how Sarco LSI's can cut your plating costs, ask for Bulletin No. 6. Call your local Sarco agent, or write direct to Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.

SARCO improves product quality and output



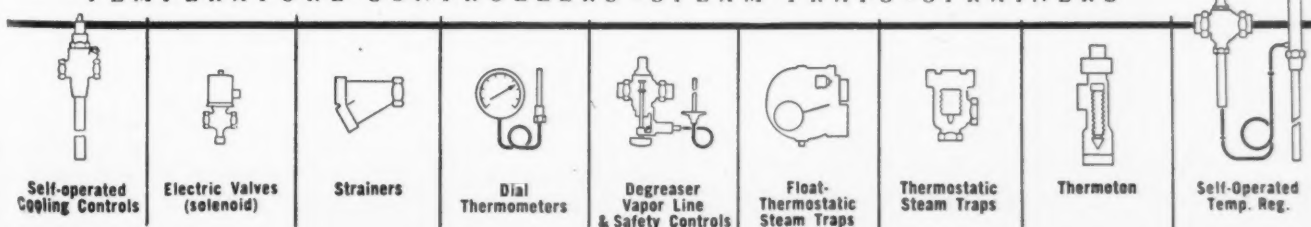
Sarco LSI Electric Temperature Controller

Can hold bath to $\pm 1^\circ$ F.; settings changed by turning one knob. Provides automatic control of heating and cooling to help prevent:

- Changes in current density
- Variations in plate thickness
- Variations in quality
- Dull finishes
- Breakdown of plating solutions
- Crystallization of salts

2023-B

TEMPERATURE CONTROLLERS • STEAM TRAPS • STRAINERS



Brighter Plating for You at Lower Cost with these Du Pont Products...

"Cadalyte" Cadmium Plating Salts



The complete cadmium plating salt, designed to simplify the production of any type of cadmium plating. Produces deposits of extreme brightness and uniformity over a wide range of operating conditions with a minimum amount of attention.

"Coppralyte" Copper Plating Salts



Sodium Formulation and Potassium Formulation — are high-purity, readily-soluble salts containing the correct proportion of ingredients for make-up and maintenance of "Coppralyte" baths.

"Durobrite" Addition Agent 309



A low cost brightener for use in cyanide zinc solutions giving bright, attractive coatings over a wide range of current density. Used in still and barrel plating, it produces high purity deposits highly suitable for use with chromate conversion coatings.

"Zin-O-Lyte" Plating Chemicals



Widely used for low-cost bright zinc plating of all types of steel. High purity, ready solubility and uniformity, make them ideal materials for production of brilliant, rust-resistant zinc deposits directly from the bath —without bright dipping.

...AND EXPERT TECHNICAL ASSISTANCE

You'll find Du Pont's technical assistance one of the most important means at your disposal in producing brighter plating. Whether it's on-the-spot technical service, product literature, or laboratory research, Du Pont has ready facilities to answer your need.

Du Pont Technical Service

In each area, practical plating men are available to give immediate technical assistance. These men have the experience to help you with your operating problems.

Detailed Technical Literature

Operating manuals for economical processes, preparation, and maintenance of plating baths.

Research and Application Laboratories

For help with the more difficult, or unusual problems.

Whether you use barrel, still, semi-automatic or full automatic equipment, Du Pont's long experience in the plating field can be of help to you. The coupon below will bring full details on how you can take advantage of Du Pont's Brighter Plating Service.

ELECTROPLATING

Chemicals • Processes • Service



Better Things for Better Living
... through Chemistry

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department • Wilmington 98, Delaware

☐ Please have a Du Pont Representative call regarding a free survey of my operation. ☐ Send the following books:

☐ "Cadalyte" ☐ "Coppralyte"
☐ "Durobrite" ☐ "Zin-O-Lyte"

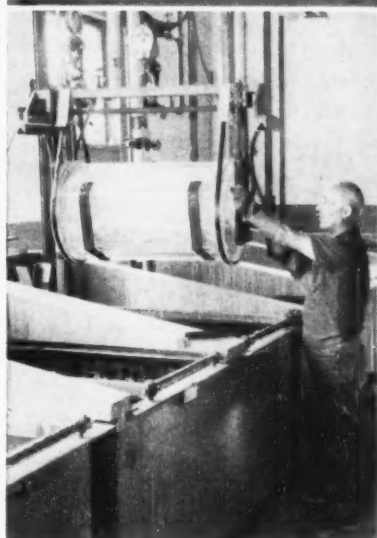
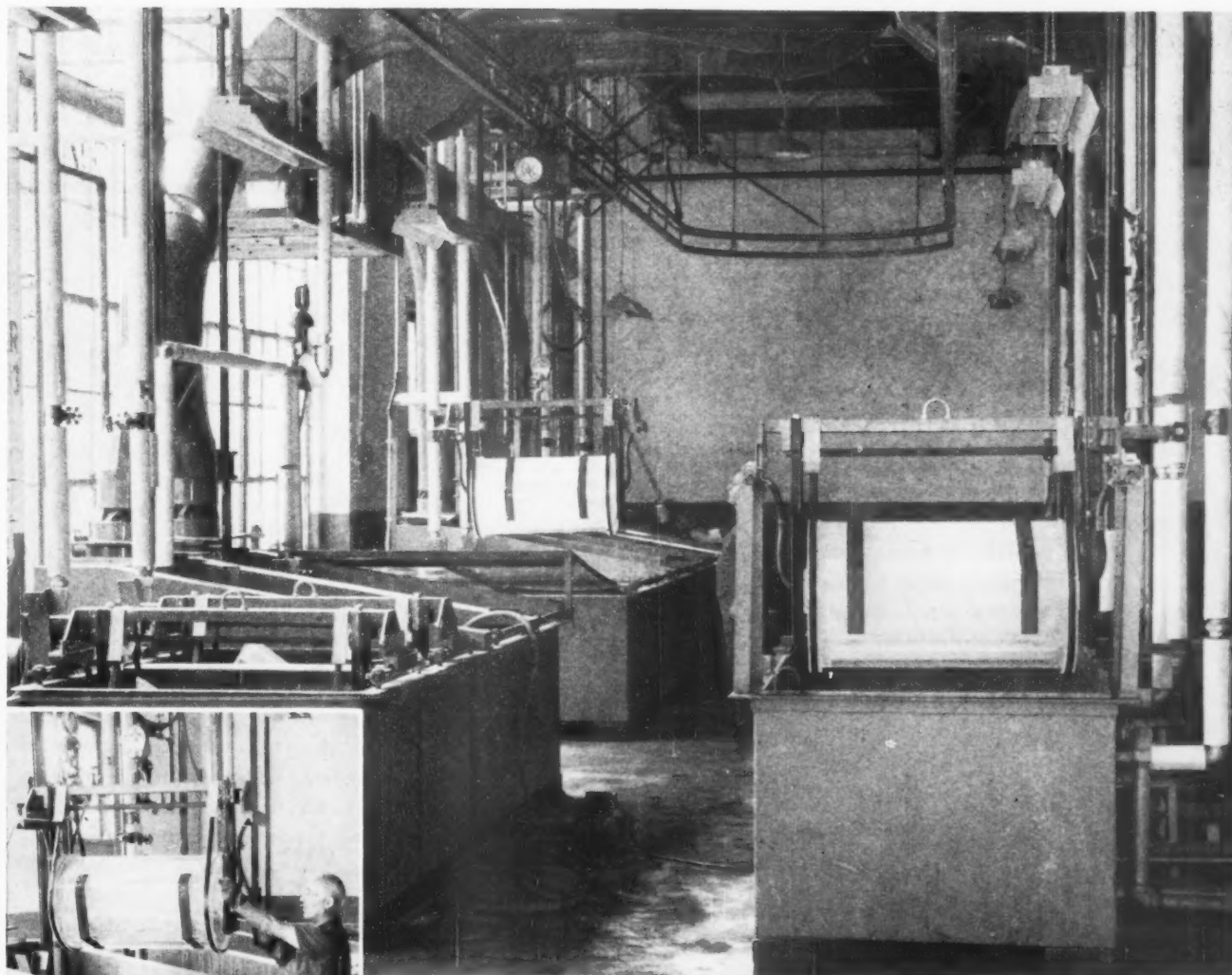
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Firm _____

Address _____

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Electric Auto-Lite adds More Proof...



that G-S means Greater Savings!

**New 2 G-S Belt Drive Barrel installation streamlines
Syracuse Division of The Electric Auto-Lite Company**

A smoother operation was the immediate result of putting in the complete "through-cycle" line of G-S Belt-Drive Plating Barrels with Loader, Unloader and Driers in the Syracuse Division of The Electric Auto-Lite Company. Plating is faster and better quality.

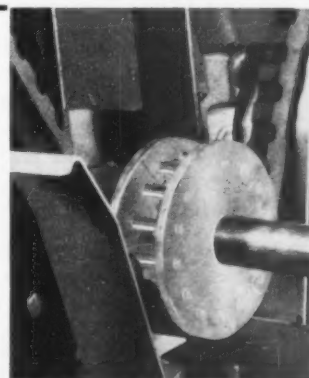
Electric Auto-Lite typical of all G-S installations!

New G-S "Cogged-V-Belt" Drive Plating Barrels outperform them all. Larger loads, faster, better plating at higher current densities. "Through-cycle" service and larger trouble-free equipment life with no down-time. Exclusive "Cogged-V-Belts" and cogged drive pulleys constant meshed for positive power transmission without gears. Cogged-V-Belts steel tensile members won't stretch. "Locking-U-Hubs" — dangles angled down through hubs won't "ride" up on load. Quick, easy changing of cylinder and dangles saves hours. Adjustable Bearings, Floating End Plates for constant contact. Total Cylinder immersion prevents explosions. Cylinders of H-T Sincolite or Tempron (hard rubber) fusion-welded, heavy-ribbed construction. **G-S equipped platers get bigger returns per investment.** Check into the G-S Conversion Plan. It costs less than you think and pays for itself in savings.

SAVE 100% gear maintenance

Elim: cyl. end drive gear, idler gear, pinion gear, 3 bearings. No gears or bearings in solution.

Exclusive G-S—"The Belt-Drive with the Gear-Grip." See more features for better, faster plating at lower cost than ever before offered. Send for Bulletin GSB-101.



The G-S Equipment Co.

5317 St. Clair Ave.,

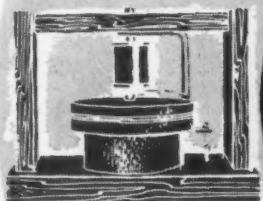
Cleveland 3, Ohio

Phone EN 1-0167, EN 1-3541

Famous FIRSTS



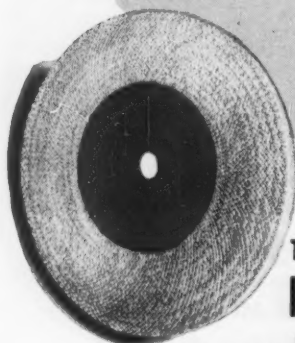
The **FIRST**
ELECTRIC LIGHT
BULB
by Thomas Edison



The **FIRST**
TELEPHONE
by
Alexander
Graham
Bell



The **FIRST**
AIRPLANE
by the Wright Brothers



The **FIRST**
BIAS SISAL BUFF
by the **JOE-D BUFF CO.**

Holders of the Original Bias Sisal
Buff Patent No. 2642706

Specialized know-how and the demands of modern industry . . . these bring progress. The vision of a cool-running, fast-operating buff adaptable to various requirements led to the first Sisal Buff by the JOE-D Buff Co. The amazing efficiency and economy of JOE-D "Fray-Proof" Bias Sisal Buffs marks them as leaders in the industry. Specify JOE-D—the Original Bias Sisal Buff—for every requirement.

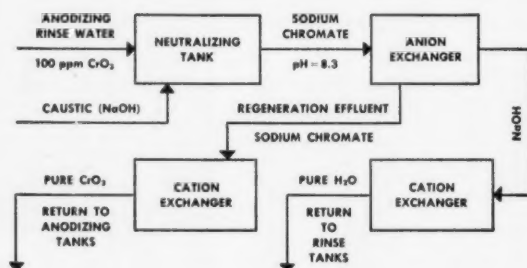
ATTENTION JOBBERS:
Some Choice Territories still available.
Write Today!

the **JOE-D BUFF COMPANY**
Sandwich, Illinois • Telephone 2171

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ILLCO-WAY

ionXchange



RECOVERY OF CHROMIC ACID FROM ANODIZING RINSE WATER

The block diagram above indicates one method of using ionXchange to save money, in the plating rooms of a large automobile plant, by recovering the chromic acid from the rinse tanks of anodizing operations. The cost of equipment was much less than the cost of a disposal plant, and the savings through recovery were substantial enough to make the investment a very profitable one.

REMOVAL OF ALUMINUM FROM ANODIZING BATH

A secondary purpose for one part of the same installation was the removal of aluminum from the anodizing baths. When the concentration of aluminum in any anodizing tank rose to nearly 1 g. per liter, that tank was cycled through the cation exchanger and the aluminum removed, thus saving over \$250 a week compared with partial dumping. *For details on this and many other money-saving applications of ILLCO-WAY ionXchange, write us or consult your Illinois Water Treatment Company representative.*

ILLINOIS WATER TREATMENT CO.
840 CEDAR ST., ROCKFORD, ILLINOIS

ILLCO-WAY ionXchange

NEW YORK OFFICE: 141 E. 44TH ST., NEW YORK 17, N.Y.
CANADIAN DIST. PUMPS & SOFTENERS, LTD. LONDON, ONT.

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No other Buff...

has all these advantages

CODMAN NON-FRAY BUFFS

1. THICKNESS OF RING VARIES DENSITY
2. TRAILING ENDS — (Safety)
3. NON-COMPRESSIBLE CONSTRUCTION
4. NON-METALLIC CENTER — (No Shaft Scoring)



F. L. & J. C. CODMAN COMPANY

ROCKLAND, MASSACHUSETTS

the greatest name in buffs for over 55 years

BRANCH OFFICES — PHILADELPHIA, DETROIT, LOS ANGELES, INDIANAPOLIS, GRAND RAPIDS



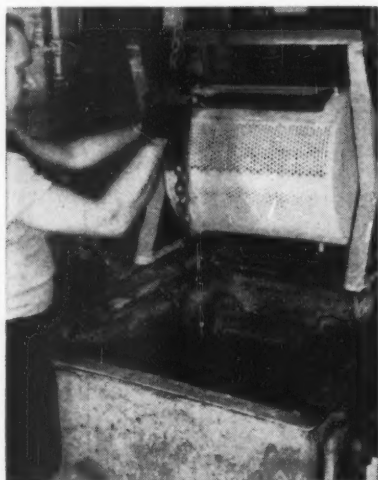
PLATERS AND FINISHERS HAVE INCREASED PROFITS

WITH TRANTER PLATECOIL®

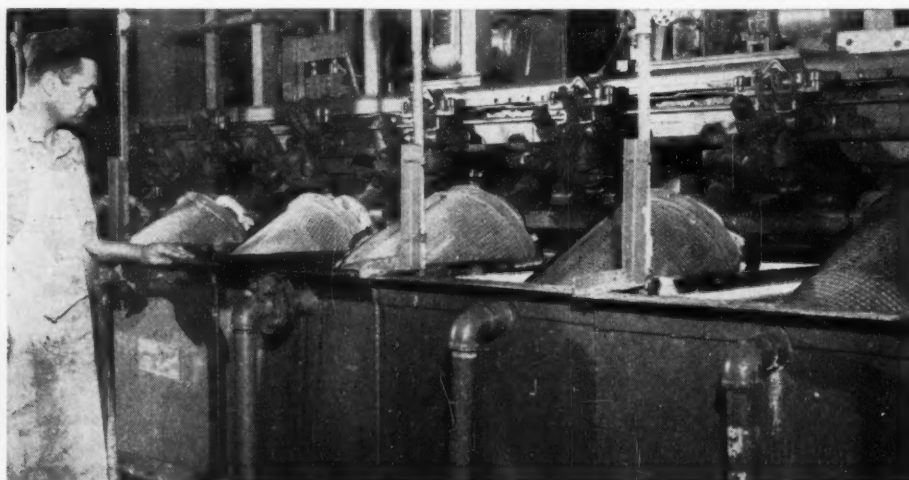
Tranter Platecoil has made remarkable savings in unproductive, unprofitable downtime for many platers and finishers. Replacement is quick and easy. Two men, with no hoists or other machinery, can install Platecoil units in minutes. More downtime is saved, too, because Platecoil's solid and relatively flat surface resists fouling and eliminates frequent cleaning jobs necessary with pipe coil. You'll find that Tranter Platecoil also heats or cools more quickly. Use Platecoil now to make more hours more productive every day.



Two Platecoil units cool this 2,000-gallon tank in an automatic zinc plating machine at Allen-Bradley Co. Rapid and economical installation and more working area in the tank are benefits cited.



Sessions Clock Co. previously had 2 sets of pipe coils for this Parker Lubrite tank and changed them every 4 or 5 days for cleaning. The Platecoil shown here has been used 2 years without cleaning.

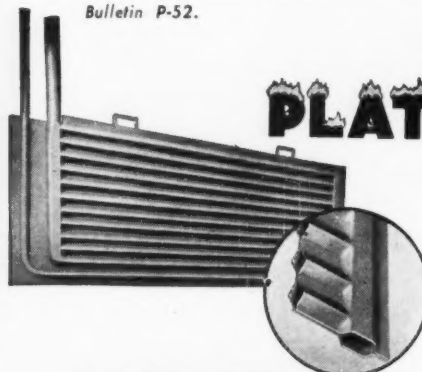


Dexter Lock Co. specifies Platecoil units in original equipment like this, and also uses them in cleaner tanks and plating, pickling, etching and oxidizing tanks. They cost less and shorten heat up time considerably.



Hiawatha Metalcraft Co. has made big savings in maintenance since Platecoil replaced direct gas firing on tank bottom. Tank pitting has stopped and dirt from the tank bottom no longer boils through the solution.

Order now for fast delivery from factory-tested stock, or for more information, send today for Bulletin P-52.



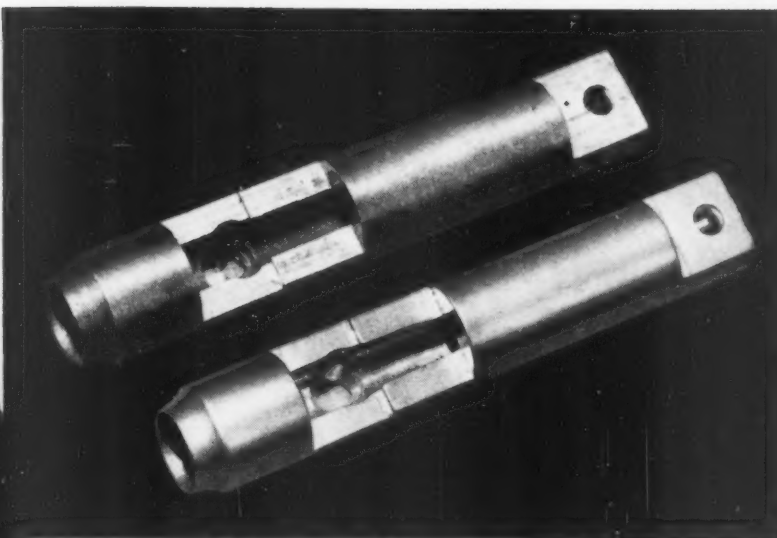
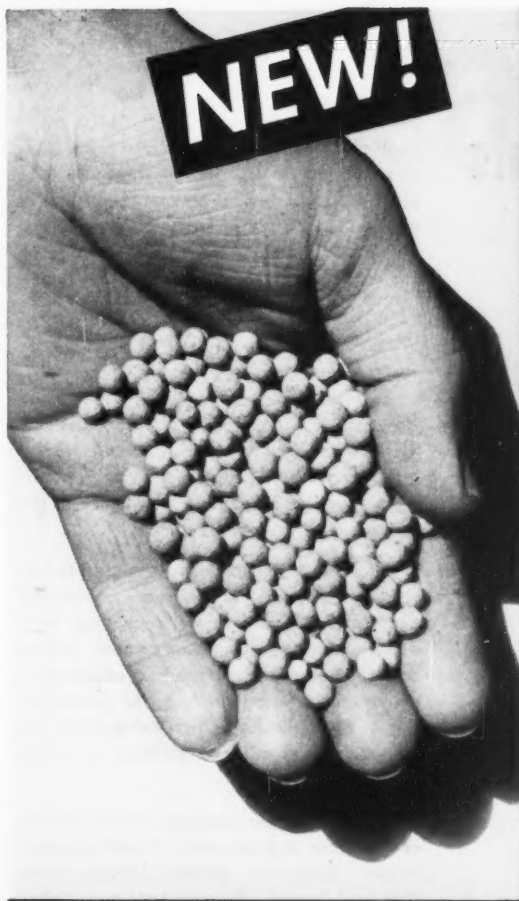
PLATECOIL®

DIVISION



TRANTER MFG., inc., Lansing 4, Michigan
You'll find our Catalog in Sweet's Plant Engineering File

NEW!



The new ALUNDUM Tumblex "S" abrasive rolls around and through intricate parts; brings high uniformity of radii and surfaces, with smooth finish, to the barrel-finishing of parts as intricate as this gun component. The "before and after" view shows you how the spheres improve external and internal areas.

Besides this $\frac{3}{16}$ " diameter size of Tumblex "S" you can order it in four other sizes, up to $\frac{3}{8}$ ". This means top barrel-finishing performance for you, in many different applications. And these new spheres are exceptionally dense and long-lasting.

Another big advance in barrel-finishing Norton Tumblex "S" abrasive spheres

From the pioneer of ALUNDUM bonded triangles — now,
new bonded spheres to help you do a better job*

If you finish parts that have hard-to-contact recesses or intricate shapes, Tumblex "S" tumbling abrasive is the latest development.

Here are the logical reasons why tubing, coil springs, scissor handles, bearing retainers, pump bodies and many other parts benefit by the new shapes and sizes of Tumblex "S" — and by its top-quality as a tumbling abrasive.

- Tumblex "S" is made in spheres that easily get into areas where other abrasive shapes can't reach.
- It comes in five different diameter sizes. #2, $\frac{7}{8}$ "; #3, $\frac{5}{8}$ "; #4, $\frac{3}{8}$ "; #5, $\frac{1}{2}$ " and #6, $\frac{3}{16}$ ", covering a big range

of parts to be barrel-finished.

- Made of famous Norton ALUNDUM abrasive, it cuts fast — resulting in shorter time cycles and lower costs per piece finished.

Send Your Work Samples

Let us demonstrate in our newly enlarged Sample Processing Department how Tumblex "S" Abrasive can give the value-adding "Touch of Gold" to your product quality and cut your barrel-finishing time and costs. NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow

*Trade Mark Reg. U. S. Pat. Off. and Foreign Countries

pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

G-318



*Making better products...
to make your products better*

NORTON PRODUCTS:
Abrasives • Grinding Wheels
Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives
Sharpening Stones • Behr-cat Tapes

Special Reports

On Finishing Non-Ferrous Metals

NUMBER II—Paint Base, Corrosion-Resistant Finishing with Iridite

WHAT IS IRIDITE®

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

Chromate conversion coatings are well known and accepted throughout industry as an economical means of providing corrosion protection, a good paint base and decorative finishes for non-ferrous metals. However, continued developments have been so rapid and widespread that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this digest of current information; to bring you up to date on the many ways in which you can obtain proper surface preparation for painting and increase product durability with a single multi-purpose chemical pretreatment. Report I on decorative, corrosion-resistant finishes and Report III on chemically polished, corrosion-resistant finishes are available on request.

First, it is an accepted fact that metal surfaces should be prepared before painting to make possible an efficient paint system. Naturally, this preparation should provide for good initial paint adhesion. Chemical treatments have proved extremely effective in this respect, particularly those of a neutral or preferably acid nature. Further, to be most efficient, chemical treatments should provide a non-porous barrier to maintain adhesion by sealing the metal from the paint and moisture. They should also provide a self-healing film which prevents lateral corrosion in the event that bare metal is exposed through scratching.

The Iridite chromate conversion coatings meet all these requirements. Iridite

is a chemical conversion treatment for surface preparation. It provides initial paint bonding by molecular adhesion. It is acid in nature and produces a film that is gel-like and non-porous in structure. Thus, the Iridite film effectively seals the metal from the paint and from moisture penetration. Because the film contains certain relatively soluble constituents, it will protect areas scratched through to bare metal and prevent lateral corrosion. This is accomplished by a gradual leaching of these constituents into the damaged area.

Further, because of its gel-like, non-crystalline nature, the Iridite film will not affect the appearance or texture of the paint film, nor will it dust or powder to mar the painted surface. Because the film is non-porous, paint coverage is increased, thus substantial savings in paint costs will be realized. In addition, treated parts may be stored for long periods of time prior to painting without the risk of entrapped moisture causing blistering when painting.

Iridite chromate conversion coatings are widely used with equal ease and success under both baked and air-dried paint systems. While the actual adherence properties of the Iridite film do not increase appreciably with its thickness, corrosion protection does. The protection of the Iridite film is proportionate to its thickness and should be taken into consideration when selecting the Iridite to meet your needs. However, it is sometimes necessary to sacrifice maximum corrosion protection for appearance when a finished

part is to be only partially painted. For example, it may be desirable to use a thin, clear, bright Iridite film if the unpainted areas must present a chrome-like appearance. A typical case is that of instrument housings on which the exterior is painted and the inside left unpainted.

On the other hand, if all surfaces of the product are to be painted and maximum corrosion protection is required, the heavier and most protective Iridite films should be used. For example, all surfaces of zinc die cast fruit juicers are finished with a highly protective Iridite film prior to painting to provide maximum resistance to the corrosive action of fruit juices.

Iridite finishes are now available for all commercial forms of the more commonly used non-ferrous metals, including zinc, cadmium, aluminum, magnesium, silver, copper, brass and bronze. In addition to providing an excellent base for paint, the Iridite films also have high decorative value when used as final finishes in themselves.

These films can produce a wide variety of pleasing appearances including clear bright, iridescent yellow, bronze, olive drab and brown. In addition, many films can be modified by bleaching or by dyeing. Among the dye colors available are various shades of red, yellow, green, blue or black.

In planning or designing, you should consider the many other characteristics of Iridite finishes which may enter into the specific problem. In addition to their functions as protective and decorative finishes, and as bases for organic finishes and bonding compounds, Iridites have low electrical resistance. Some can be soldered and welded. The film does not affect the dimensional stability of close tolerance parts.

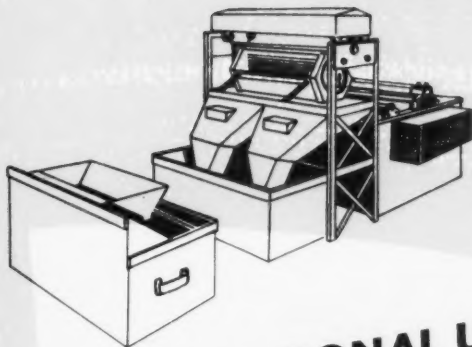
Iridites are widely approved under both Armed Services and industrial specifications because of performance, low cost and savings of materials and equipment.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product requires the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 East Monument Street, Baltimore 5, Maryland.

Lea

Copper-Glo

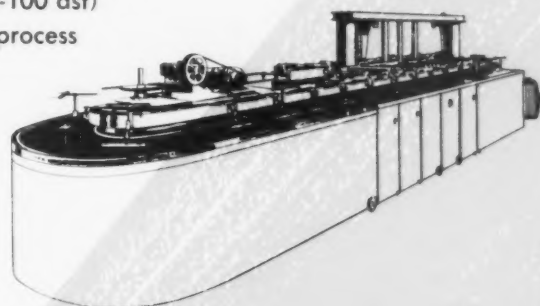
has a new partner



LEA-RONAL Ultra-Tartral combined with LEA Copper-Glo means that LEA-RONAL High Speed Bright Copper Process is so vastly improved as to be practically a new process.

Here are a few of the new features this new combination will give you:

- ★ freedom from burning in spite of much higher current density
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- ★ higher free cyanide content permitted without loss of efficiency
- ★ sodium cyanide may be used with higher current densities than is possible with an equivalent potassium formulation without Ultra-Tartral; this means real economy
- ★ improved anode corrosion
- ★ carbonate tolerance is even greater than ever before; no need to control carbonate.



This new and improved LEA-RONAL High Speed Copper Plating Process offers so much in the way of improved operations and economy that you should make at least a trial run. We suggest that you set aside one tank or section for comparative tests. Our technical staff can recommend a formulation for converting your present cyanide bath to this improved LEA-RONAL Process.



serving the Finishing Field
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Lea-Ronal, Inc., Jamaica, N. Y.
Lea Mfg. Co., of Canada, Ltd.
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High Speed Bright Copper Process is a LEA-RONAL INC. Process

On this particular Lea-Ronal Process all inquiries should be directed to:

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Lea-Ronal

ULTRA-TARTRAL

A new concept in Cyanide Copper Plating which:

- ★ Increases allowable cathode current density.
- ★ Eliminates or reduces burning.
- ★ Makes baths simpler to control.
- ★ Eliminates carbonate control.

ULTRA-TARTRAL

SUPERTARTRAL

POTASSIUM TARTRATE

ROCHELLE SALTS

ULTRA-TARTRAL is another Lea-Ronal major improvement in cyanide copper plating.

ULTRA-TARTRAL is a major improvement over the prior old fashioned type of Rochelle Salts and Rochelle Salts substitutes.

1. ULTRA-TARTRAL raises the allowable operating cathode current density with **FREEDOM FROM BURNING**. It no longer becomes necessary to worry about high current density corners or edges.

2. With ULTRA-TARTRAL the cyanide copper bath becomes less sensitive to variations of concentration in free cyanide or copper cyanide. With the Lea-Ronal Bright Plating Process it permits operation with either lower metal concentrations for the potassium formulation or substituting the less expensive sodium cyanide in the sodium formulation.

3. ULTRA-TARTRAL makes carbonate control a thing of the past. It completely eliminates costly carbonate removal treatments.

4. ULTRA-TARTRAL costs no more to use than Rochelle Salts yet it gives you so much more.

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THINKER BOY Plating Racks
Reduce racking costs — tremendously!

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You don't have to use inefficient racks to get work out on time. With THINKER BOY you can assemble racks designed for the job and be in production over night.



Just drill holes to install tips or join frame members—insert studs—draw nuts tight—install sealing caps.

REDUCED COSTS

With THINKER BOY rack designing is easy and fast—No sketching—No drawing—Just lay out the THINKER BOY Members and Tips with the work you have to plate. You can make a sample rack in minutes. Develop highest racking efficiency for lowest racking costs.

NOW
ONLY
\$ **2**⁷⁸

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24" — \$2.78

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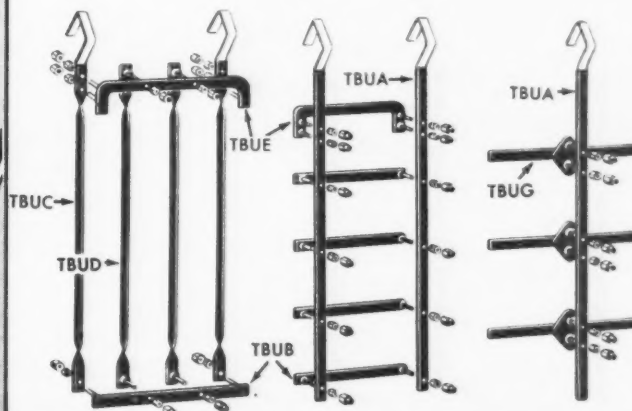
36" — 3.12

FLEXIBILITY UNLIMITED

With THINKER BOY a broken or damaged tip doesn't ruin or tie-up the rack. You can replace THINKER BOY Tips right on the job in a jiffy.

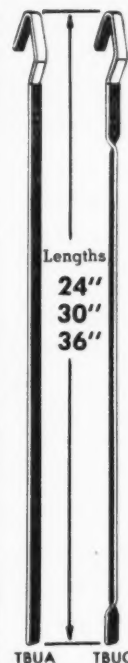
When a job is all through, finished, THINKER BOY Racks do not become worthless like other racks. You can change the tips or tip spacing for efficiently plating other work, or disassemble and use the parts in other racks.

With THINKER BOY Rack Members you can assemble single, double, triple or quadruple spine racks, cross bar, and T racks in a wide range of sizes to the spacing you want.



Send for the THINKER BOY Instruction Manual. See how simple it is to assemble completely insulated racks of your own design. Check the great variety of THINKER BOY Tips. The more you think about THINKER BOY the more you will save.

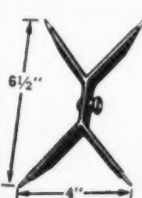
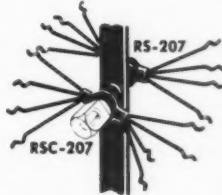
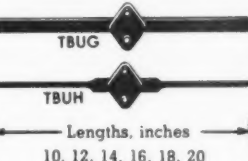
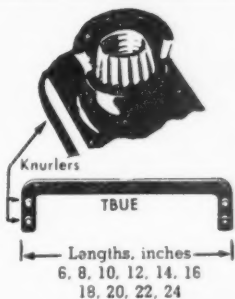
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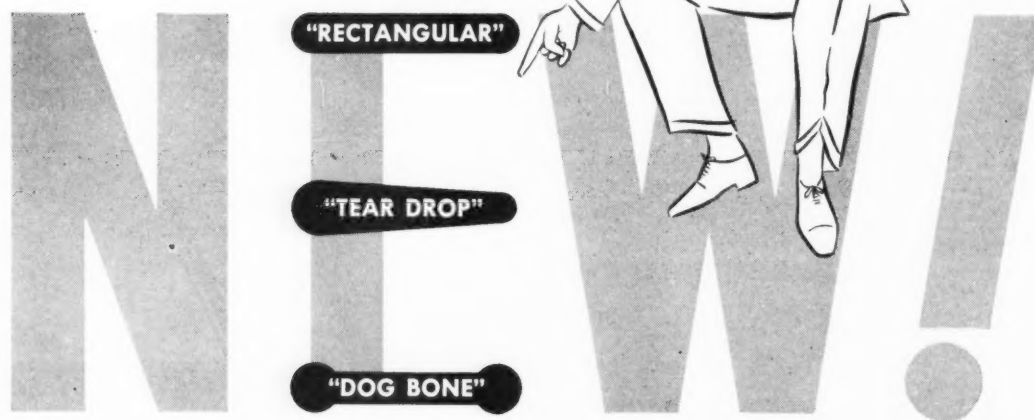


FS-101D



RS-207

3 STANDARD SHAPES



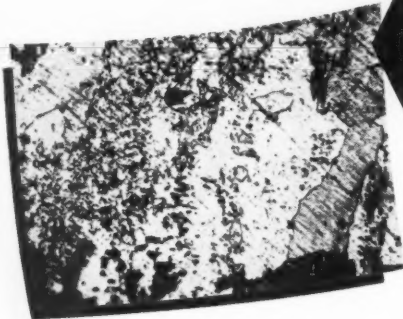
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"TEAR DROP"

"DOG BONE"

SHAPED, EXTRUDED APW SILVER ANODES

CONTROLLED GRAIN SIZE: APW EXTRUSION PROCESS* controls grain size within definite limits—minimizes sheddings



ROLLED FLAT PLATE ANODE SECTION: Photomicrograph illustrates highly irregular, uncontrolled grain size—a major cause of shedding and rough electrodeposits.

*Pat. Pending



The three standard shapes of APW Extruded Anodes were developed to extend the useful life of anodes—to lower plating costs!

Through scientific design, the distribution of mass material helps to maintain a more efficient ratio between anode weight and active surface area. After 85% by weight has been plated off, this APW anode retains 80% of its original active surface area! You profit three ways with longer anode life, minimized polarization and less silver scrap to be refined.

Another equally important advantage of the new APW Extruded Anode is the small, uniform grain size—controlled between definite ideal limits! As a result, corrosion is smooth and uniform for consistently smooth electrodeposits. Shedding is virtually eliminated—rejects are a comparative rarity!

To be certain the silver you buy in anodes is used most efficiently, APW will develop special anode shapes to meet particular plating bath conditions. We'll be glad to assist with your anode problems.

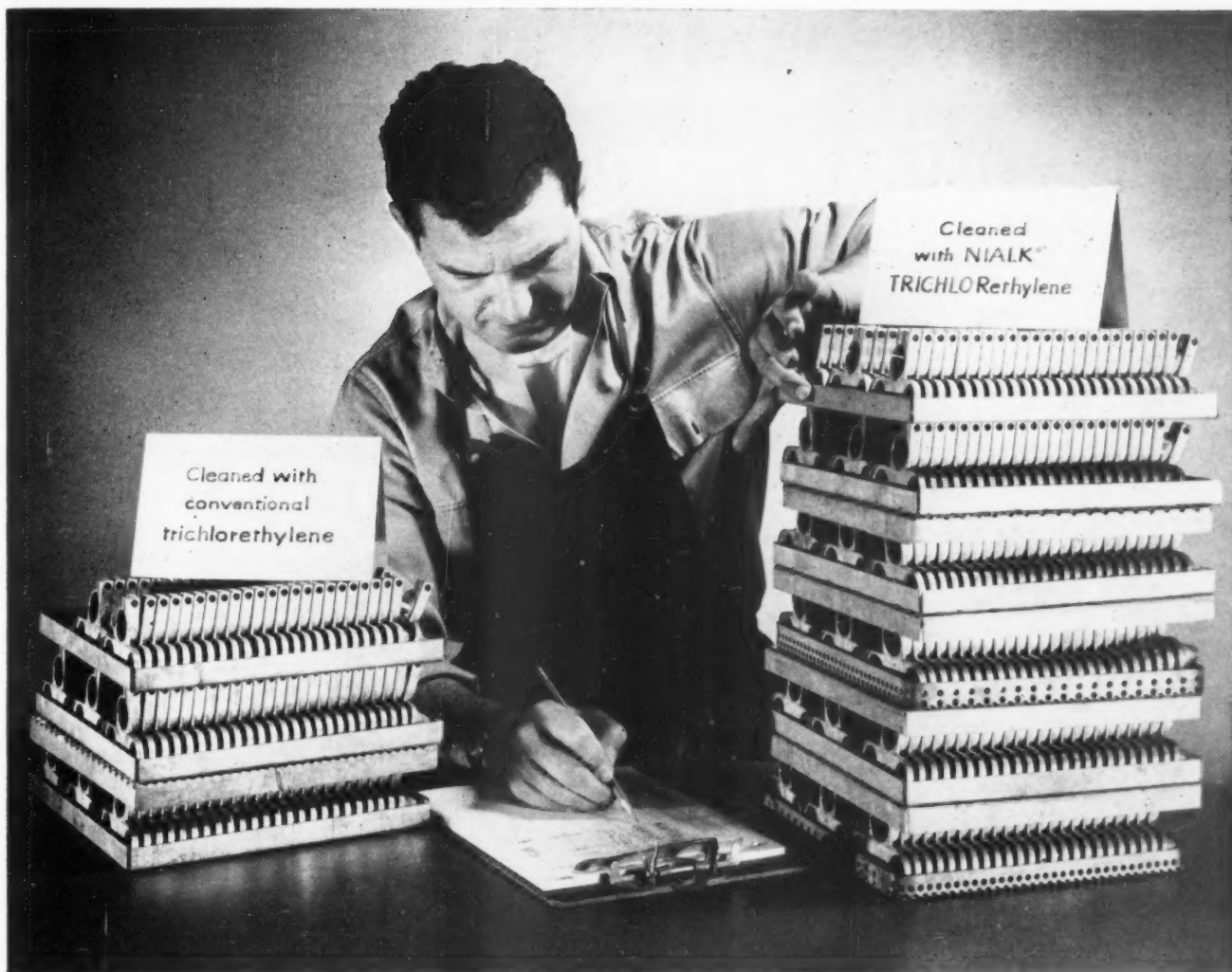
APW EXTRUDED ANODE SECTION: Note small, fully controlled regularity of grain size to promote uniform corrosion, smoothest electrodeposits and less rejects.

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Operator using NIALK TRICHLOREthylene cleans more parts, because NIALK has **psp** which prevents acid contamination, reduces number of cleanouts.

Why you get more effective degreasing when you use Nialk® TRICHLOREthylene with **psp**

There's a difference—a big, cost-cutting difference—between NIALK TRICHLOREthylene and conventional vapor-degreasing solvents.

Light, heat, air, acids, and active metals such as aluminum, given time, can break down improperly stabilized trichlorethylene, making it unfit for further degreasing.

Only Nialk

TRICHLOREthylene has **psp**

The stabilizer in NIALK TRICHLOREthylene has **psp**—permanent STAYING power. It's neutral, non-alkaline.

You *never* have to replenish it.

Only NIALK has this *permanent staying power*. Even after repeated distillations, its unique stabilizer prevents acid formation and other causes of breakdown. NIALK works equally well with *all* metals.

psp means cheaper degreasing... here's why

You don't have to clean out your degreaser nearly so often with NIALK TRICHLOREthylene. You can degrease many more parts between cleanouts.

The NIALK stabilizer actively retards formation of degradation products in your degreaser—cleanouts are easier, faster.

Get proof of Nialk's cheaper, safer degreasing

See for yourself how NIALK TRICHLOREthylene with **psp** stays stable, keeps cleaning efficiently long after other solvents have lost their punch. Write on your business letterhead for a revealing resumé of comparative metallurgical tests on the five leading brands.

HOOKEE
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6-1613

HOOKEE ELECTROCHEMICAL COMPANY

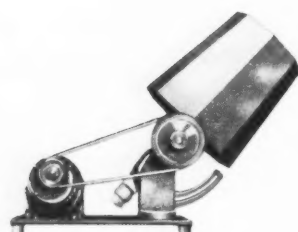
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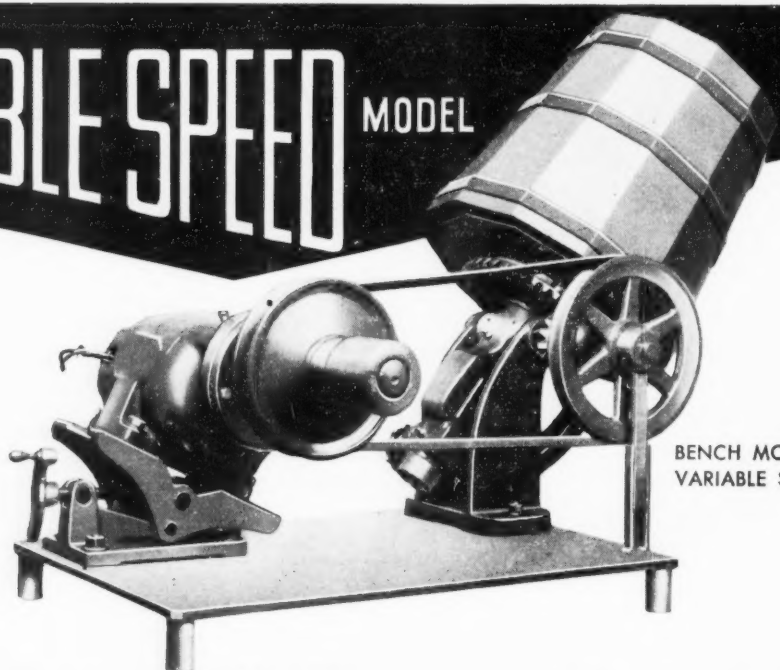


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VARIABLE SPEED MODEL



Bench-Type Single Speed



BENCH MODEL
VARIABLE SPEED



No. 5—Single Speed

Note Carefully These IMPORTANT POINTS

Barrels can be filled with parts or abrasive—*while running*.

Work can be watched — samples removed for inspection — *while running*.

Angle can be changed for best abrasive or polishing action — *while running*.

Barrels can be emptied by tilting to pouring position — *while running*.

Barrels are made in various sizes, shapes, and materials. They are easily replaced.



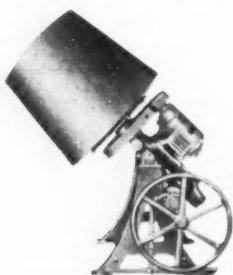
No. 5—Variable Speed



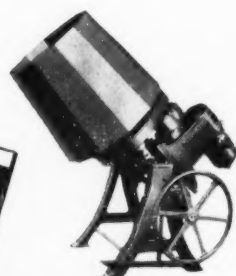
No. 5A—Single Speed



No. 5A—Variable Speed



No. 6—Single Speed



No. 6—Variable Speed

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Pfizer Citrates, Gluconates and Tartrates contribute to brightness like you see above. Whether it be through electroplating, cleaning or polishing, these Pfizer organic acids offer many advantages to metal finishers. One big advantage is **NON-TOXICITY**—greater safety for personnel in materials handling. Another advantage is mildness—so necessary in household and specialized industrial cleaners and polishes. Write for *Technical Bulletin 61* which describes in detail the many outstanding uses for **PFIZER ORGANIC ACIDS** in metal finishing.

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OFFERS Green Selenium Rectifiers

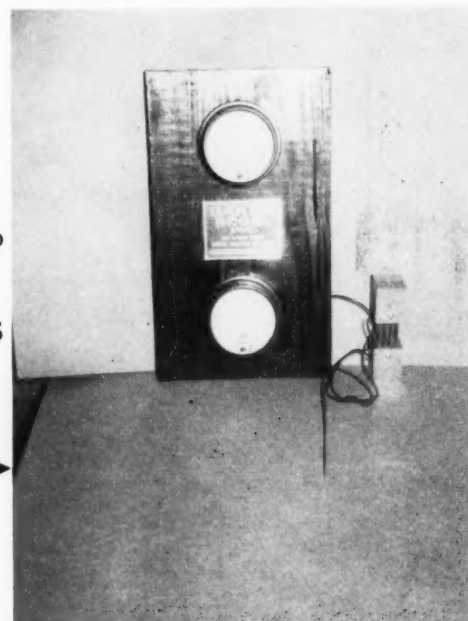
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MAGNETIC STARTERS
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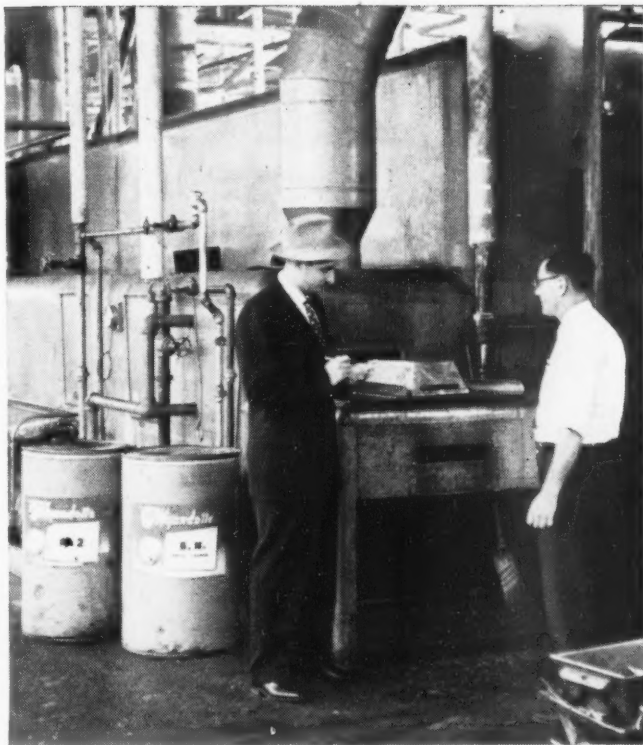
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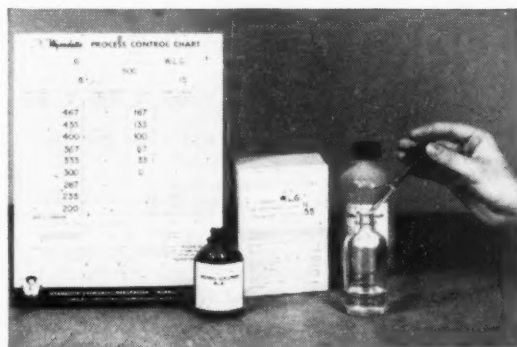


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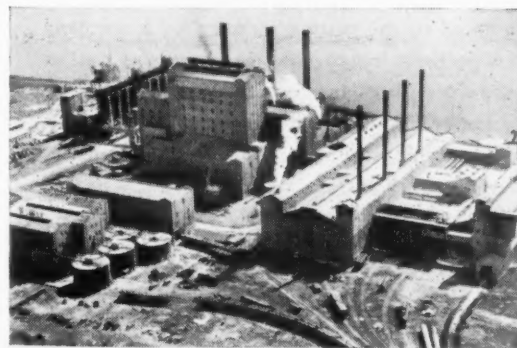


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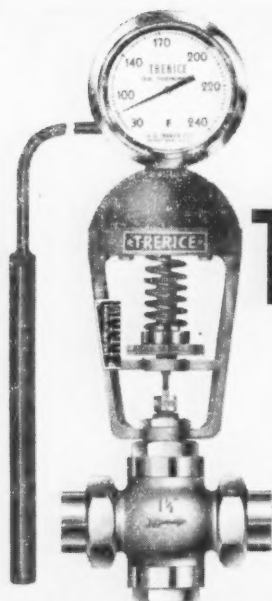
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Why TRERICE Temperature Control

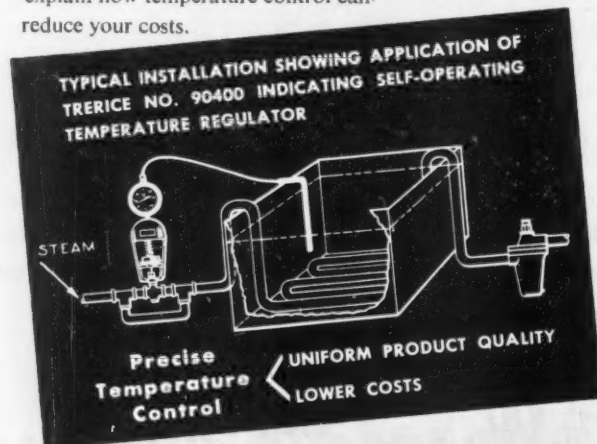
... in Plating and Metal Finishing Operations?

WHY temperature control? First of all, to assure uniform quality; second, to reduce processing costs.

Maintaining bath temperatures at the *one best level* used to be a serious problem. But not anymore. Today, TRERICE controls are automating plating processes throughout the metal finishing industry... maintaining precise temperatures *automatically*—TRERICE regulators prevent evaporation losses, cut down on rejects, insure uniform product quality! You save time, labor and fuel costs. Not surprising, then, that TRERICE controls are standard with leading original equipment manufacturers. Behind this wide acceptance is the TRERICE reputation for quality, and a nationwide sales and service organization.

The TRERICE line is a *complete* line. Each TRERICE temperature control installation is set up to meet the specific requirements of the user, insuring uniform product quality at the lowest cost.

If your operation involves cadmium, chromium, copper, nickel, tin or zinc plating; anodizing, bonderizing, cleaning, pickling or rinsing, it will pay you to have a "Trerice Man" explain how temperature control can reduce your costs.



Send Today for Bulletin 803—TRERICE TEMPERATURE CONTROLS for the Metal Finishing Industries

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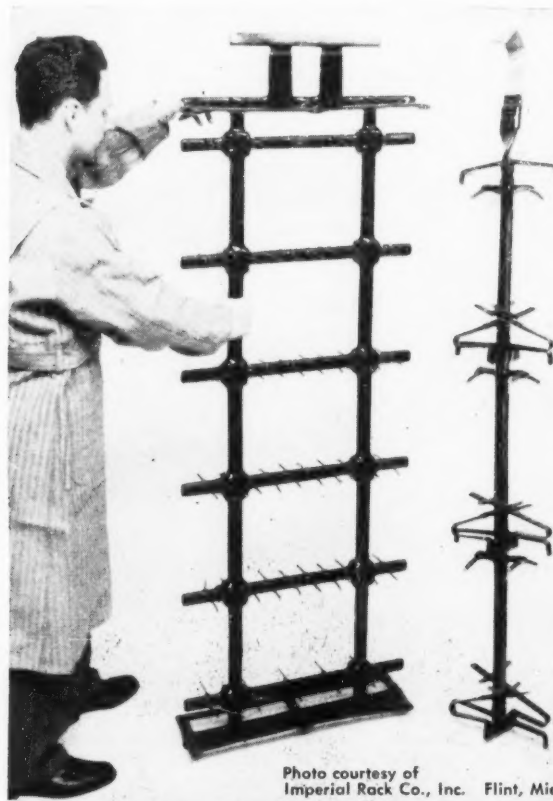


Photo courtesy of
Imperial Rack Co., Inc. Flint, Mich.

chem-o-sol® coating adds life to these PLATING RACKS

Chem-o-sol's excellent chemical and heat resistance means longer life for plating racks and other plating equipment.

A smooth, rapidly draining coating of **chem-o-sol** on plating racks will reduce carry-over of solutions, protect them from contamination.

This special **chem-o-sol** can be applied to equipment in just one dipping operation. Also available in spraying form for in-shop application to bulky equipment such as tanks, fans and other items subject to corrosive deterioration.

Our custom formulated plastisol (**chem-o-sol**) has been tailored to the plating industry by a company whose experience has covered many years as well as many industries. We have developed **chem-o-sols** for application by dipping, molding, spraying, die-wiping, spreader coating, printing, and many other methods.

Our laboratory and research facilities are at your service. We welcome your inquiries and your problems.

Chemical Products



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METAL FINISHING, December, 1956

A HOT IDEA FOR COOL PROFITS

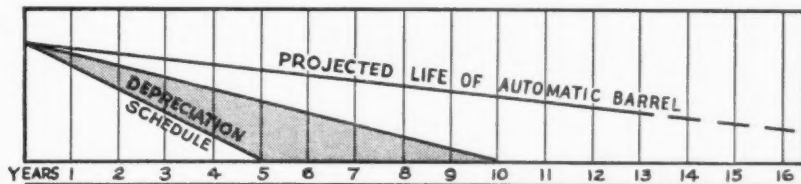


by A. B. HOEFER
Vice-President
FREDERIC B. STEVENS, INC.

THE FINISHING TOUCH

Stevens Automatic Plating Barrels Adaptable to Any Situation

IT'S GOOD TO KNOW WHEN YOU ARE INVESTING in a plating machine that Stevens units can be designed so that more than one type of plating can be done on one machine. Also, that changes can be made in the future to meet any specifications you may have. We've changed over a good number of Stevens machines in our time. That's why there are so many Stevens machines in use far beyond their depreciation schedule.



THERE ARE MANY OTHER SAVINGS you can enjoy beyond long life. Stevens Automatic Barrel machines require only one employee to operate the machine. These units are completely automatic, because the open end barrel is loaded when in a vertical mouth-upward position and automatically unloaded by tilting the barrel downward. There are no lids to fasten or unfasten.

POSSIBLE MIXING OF PARTS IS ELIMINATED in the Stevens automatic barrel. Small, special loads can be conveniently run without penalizing the productive capacity of the machine and without the inconvenience of partitioned cylinders. Stevens Automatic Barrel Machines are used for varied processes that include copper strike; copper, nickel, tin, brass, zinc and cadmium plating; phosphating; alrocing; dichromating; cleaning and bright dipping.

THE SIMPLE COMPACT DESIGN of this machine permits production capacities as high as 4,000 pounds per hour. Simplicity of design makes it equally practical to distribute the capacity between two or more machines to provide flexibility in plating thicknesses and production.

Let us give you more details on Stevens Automatic Barrels. Write us today, Frederic B. Stevens, Inc., 1814 Eighteenth Street, Detroit 16, Michigan.

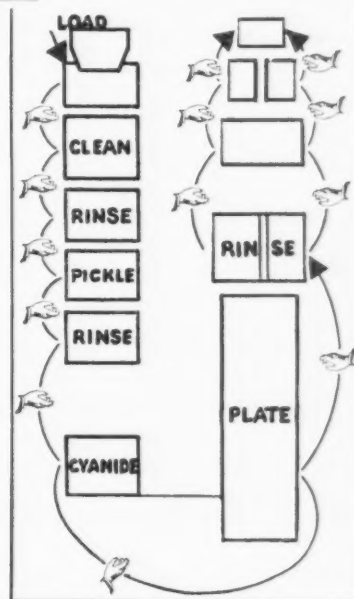


METAL FINISHING EQUIPMENT AND SUPPLIES
FROM CASTINGS OR STAMPINGS TO
FINISHED PRODUCT

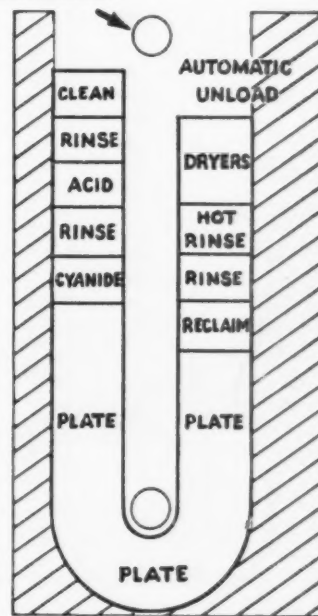
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HOW AUTOMATIC BARREL PLATING CAN REDUCE YOUR HANDLING AND BURDEN COSTS—

Compare this
Conventional Horizontal Barrel Line



With this
Stevens Automatic Barrel Installation

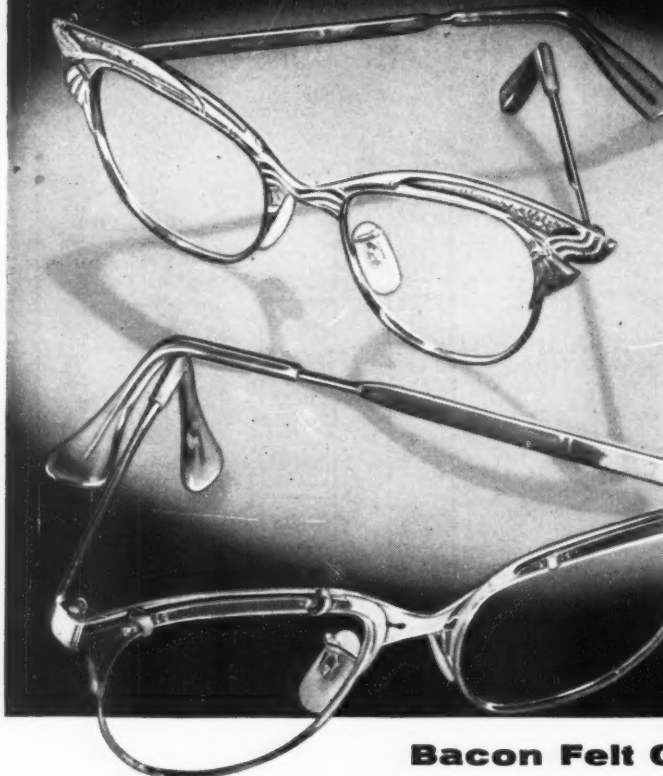


Production from both installations is the same.

Notice how many more handling steps (indicated by the illustrated hands) and manual load-unload operations (indicated by the arrows) are required for the manual set-up.

Notice, too, how much floor space (indicated by shaded area) is saved with a Stevens automatic installation. No manual operations required with automatic load and unload.

Another **fine** product made **finer** . . .

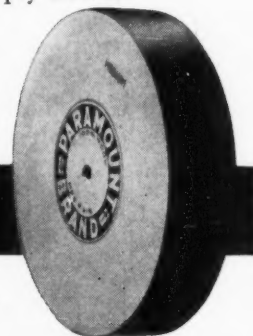


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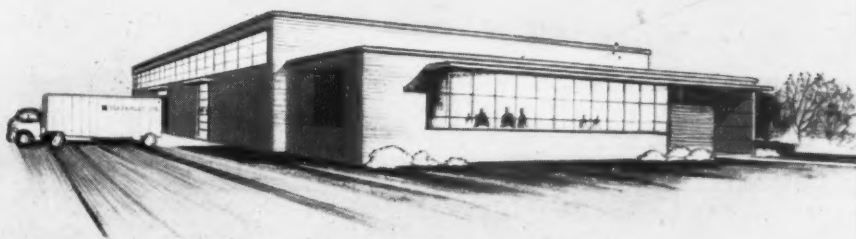
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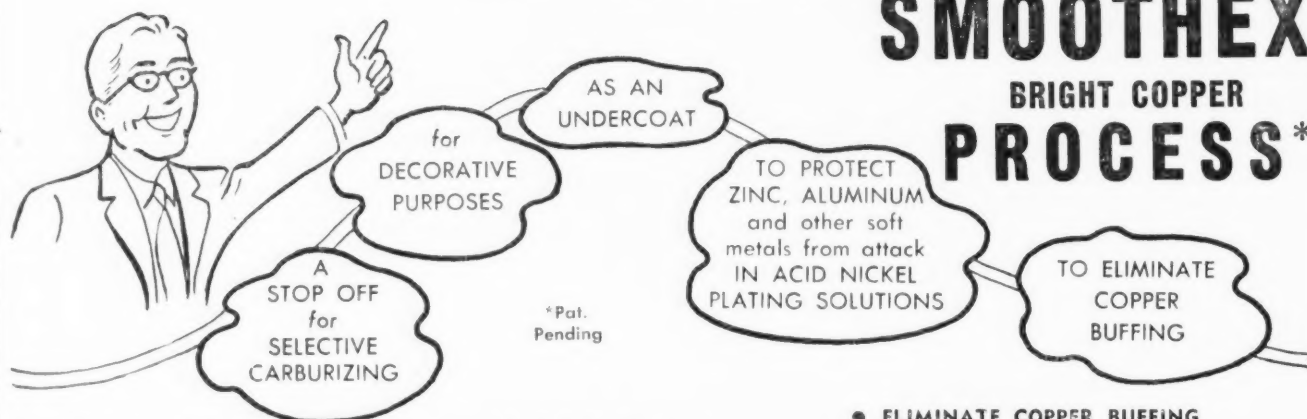
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By SAMUEL WEIN



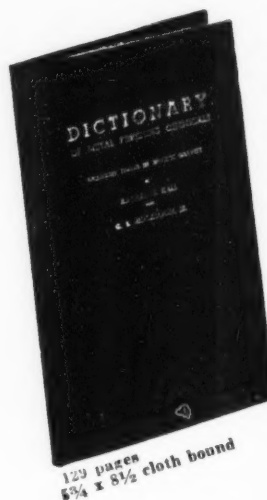
The present work deals with every known method for "metallizing" or the deposition of metals by electrolysis (plating) or non-conductors. It is divided into several sections, i.e., those processes which use chemical, mechanical and physical methods for treatment of surfaces for metallizing. In these groups the specific methods are chronologically reviewed and so the reader can very readily get a better idea of the progress made by the various workers in these arts. At the end is an alphabetical listing of contributors to the art, so that the serious workers can refer to the original sources of the information given in the text by Mr. Wein.

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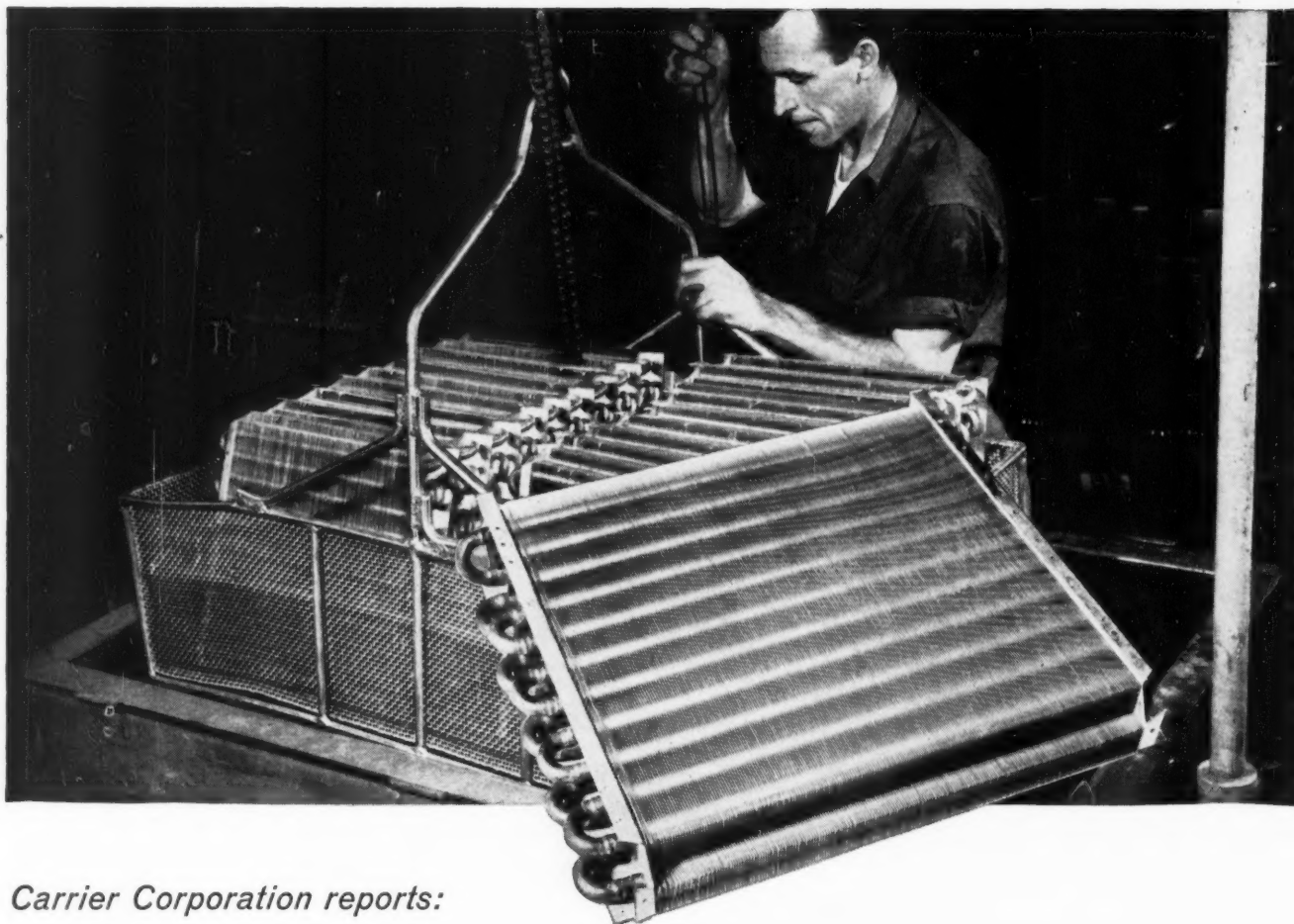
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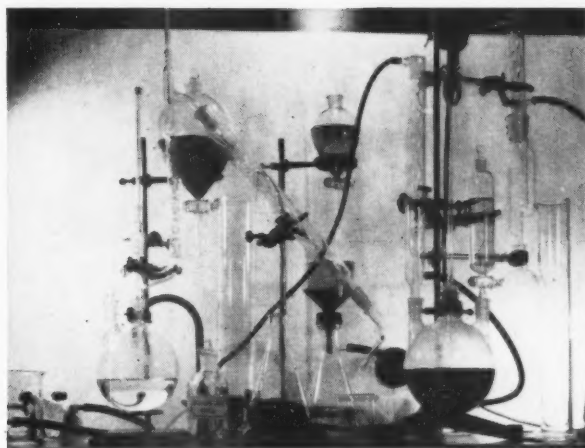
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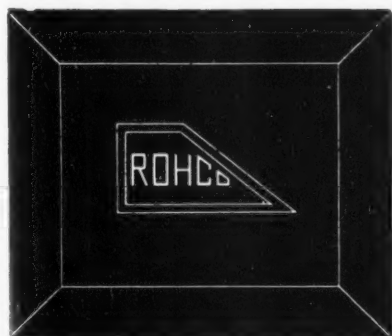
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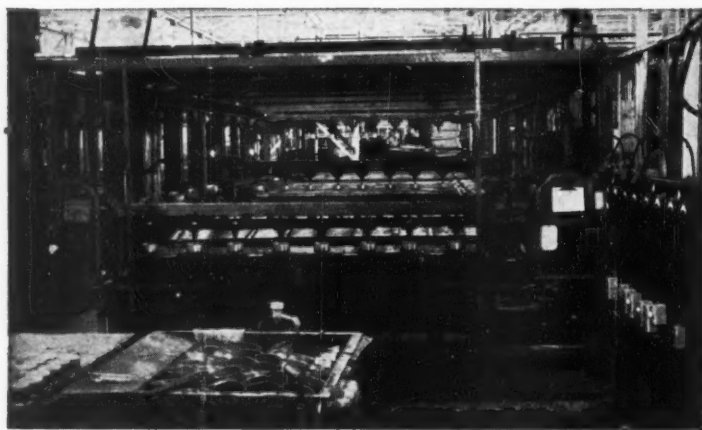
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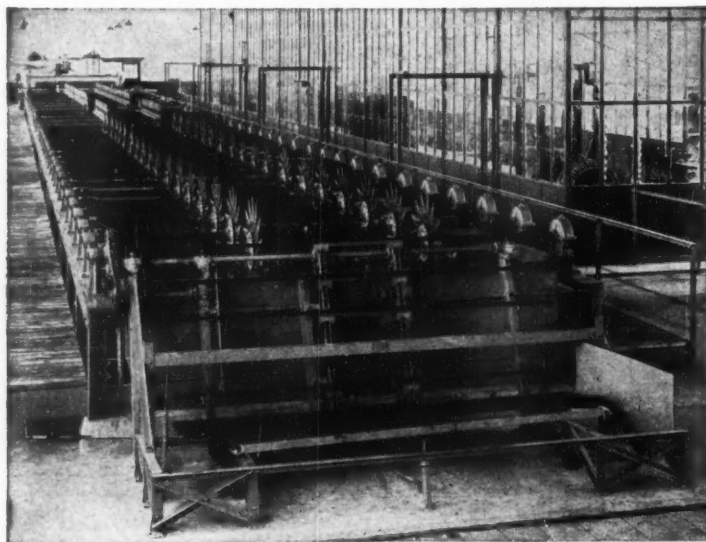
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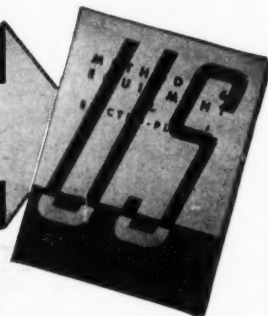
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DECEMBER, 1956

Volume 54 Number 12

FEATURES

Editorial — Year End Thoughts	55
Bufs for All Purposes	56
By Edwin F. Doyle	
Surface Treatment and Finishing of Light Metals — Part XII-B	62
By Dr. S. Wernick and R. Pinner	
Barrel Finishing Equipment	65
By J. B. Mohler	
Finishing Pointers	71
Science for Electroplaters — Part XIX-1	72
By L. Serota	

DEPARTMENTS

Shop Problems	75	Associations and Societies	104
Patents	77	Letter to the Editor	112
Abstracts	82	New Books	112
Recent Developments	86	Annual Index	116
Business Items	96	Manufacturers' Literature	127

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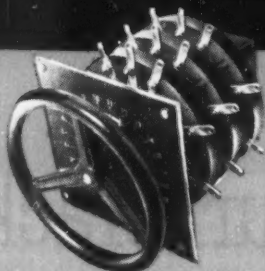
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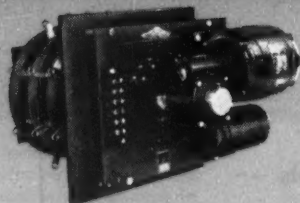
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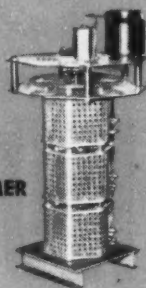
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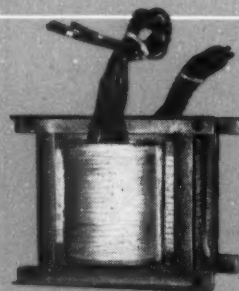
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Use	Recommended Control
Batch Tank Plating	Manual tap switch.
Batch Tank Plating with wide load variations and high production	Motor operated variable auto-transformer or motor operated tap switch.
Barrel Plating	Manual tap switch. No control rectifier.
Cleaning & Pickling	Manual tap switch. No control rectifier.
Conveyor—many stations	Manual tap switch (remote control). Motor operated tap switch. Saturable core reactor. Motor operated continuously variable auto-transformer.
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Chrome strike in combination with Plate	Automatic programming with variable auto-transformer or special series hook-up.
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Color Anodizing	Automatic constant current with variable auto-transformer. Automatic constant current with magnetic amplifier and saturable core reactor.
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Year End Thoughts

Again, we have reached a time of the year when the editor temporarily dismisses from his mind a chronic dissatisfaction with matters as they are in our industry and turns his thoughts to more pleasant things. Of course, in order to enter into the spirit of the season, the reader must necessarily forget the nickel situation, the increasing cost of doing business, and the murderous competition against which he has struggled all year. Having hurdled this obstacle to his peace of mind, he can now consider his position with grateful appreciation of what might have been.

He can remind himself that there are still places on the globe where alkaline cleaners are heated over a wood fire out in the yard; that is, if the plater is fortunate enough to have a hot cleaning solution at his disposal. And, our reader can be thankful that he works with a roof over his head when it happens to be raining outside. In many lands, the metal finisher also has to be a manufacturing chemist, since import restrictions render unobtainable such obvious requirements as brighteners, buffing compositions, and many common chemicals. And, our reader can bask in the warm assurance that these necessities are within reach of his telephone, without red-tape and bureaucratic delays. All over the world today products are being made by men who, in their wildest dreams, could never entertain the possibility that they might, some day, be able to afford their purchase. And, at the end of the day, our reader gets into his own car, the one with all the polished and bright plated trim, and drives home where he can enjoy the modern conveniences, to the manufacture of which he has contributed his efforts.

We could go on and on in this vein but, by now, the reader should already be experiencing a warm feeling inside brought on by the knowledge that he is not as badly off as he thought he was. On the contrary, he can consider himself pretty well off, relatively speaking.

Nathaniel Hall

Metal Finishing

**Wishes You A Very Merry Christmas and A
Happy and Prosperous New Year**

BUFFS FOR ALL PURPOSES

By Edwin F. Doyle, *Barker Bros., Inc., Brooklyn, N. Y.*

THE process of producing a decorative finish by buffing has expanded tremendously since the end of World War II. It has resulted in new methods, the development of new type buffs and the refinement of old types. There have been constructive steps made to improve buffing fabrics by leading cotton mills. Several successful impregnations or treatments of fabric have been developed by buff companies and bleacheries.

The following paragraphs will be devoted to a brief description of various types of buffs that are widely used. The outstanding qualities of each type will be mentioned and the types of work each is best suited for. No attempt will be made to list the many special purpose buffs made for specific jobs or buffs having limited applications. Types of sewing, types of material, and cloth treatment will be described and the outstanding feature of each will be discussed. It is hoped that the information given, applied to the individual buffing requirement, will result in better finishes at lower cost.

Buff Types

BIAS BUFF — AIR COOLED:

Material is first cut into bias strips. These strips are

then wound around and fastened to a center hub. The buff formed has all threads of the material approaching the edge at a 45° angle, thereby eliminating fraying of the material. The center hub is usually metal or fiber board, metal being the most popular (Fig. 1).

This is most widely used of all types of buffs. It gives the best results on most automatic and semi-automatic buffing operations. Much faster cutting speeds are possible because less heat is developed and air cooling helps dissipate the heat that is developed. Longer wear and faster operation make it economical for many hand buffing operations. The amount of material pleated around the buff will govern the hardness, the length of cut, and the flexibility. This type of buff is best suited for most industrial buffing operation. The bias buff is constructed on a variety of steel centers. Standard center sizes are 3", 5", 7" and 9" diameter. The center sizes are usually determined by the buff diameter. The most widely used material is the 86/93 cloth described later under materials. 16 and 18 ply sections are most common. Including width of hub, each section equals about 1/2 inch of face thickness. Sections are assembled on the lathe to the desired face width. Surface speeds up to and exceeding 12,000 feet per minute are possible.

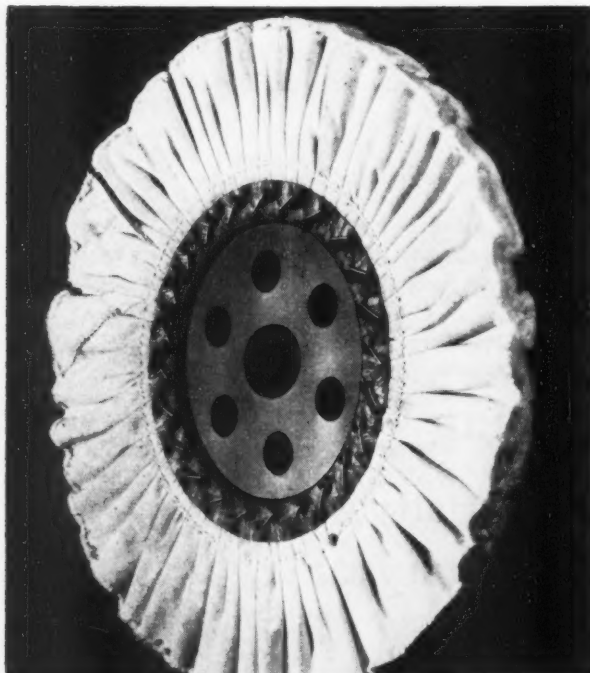


Fig. 1. Bias Buff — Air Cooled.

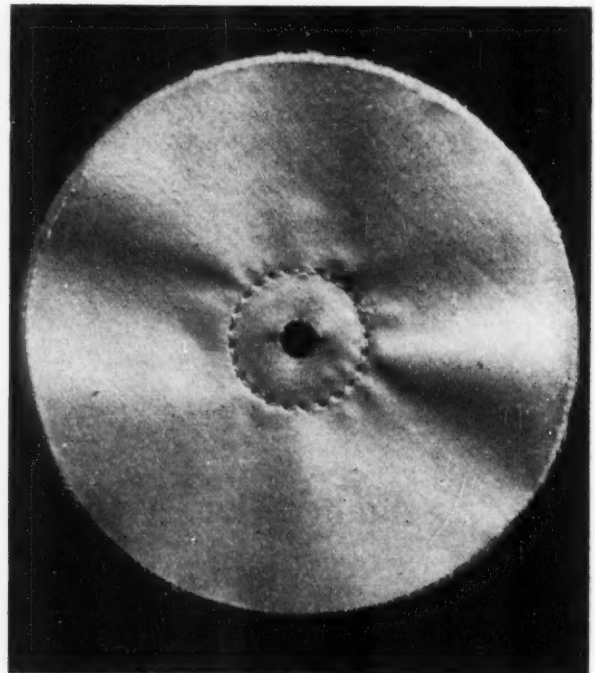


Fig. 2. Full Disc Loose Buff.

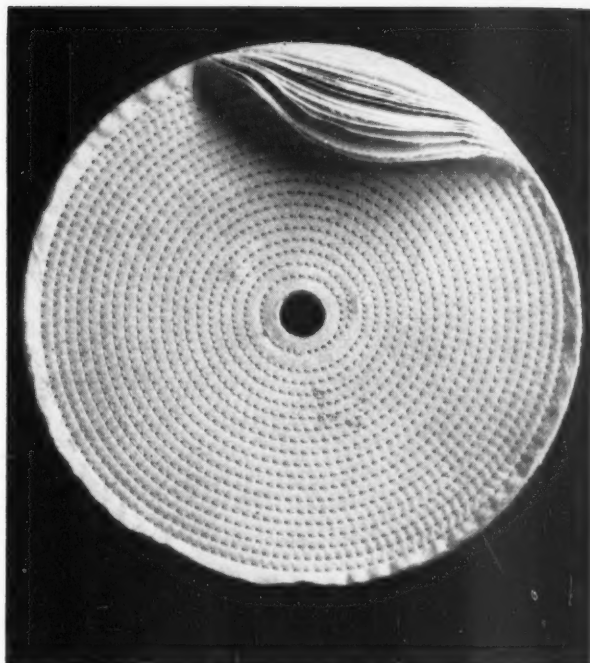


Fig. 3. Full Disc Sewed Buff.

FULL DISC — LOOSE:

Round discs are cut from sheeting and assembled into buff sections, usually 18 or 20 ply in thickness (Fig. 2). The discs are turned in such a manner that the threads of the material lie in different directions in each succeeding two plies. This enables the buff to wear evenly around the periphery. One row of sewing is added near the arbor hole to hold the discs together. A number of these sections are usually assembled side by side on the lathe arbor to make the desired face thickness.

This type of buff is used extensively for coloring operations. It has a uniform surface, will not catch irregular work, and can be used for both cut and color operations on small and irregular shaped work.

Material may be any of the types listed and diameters from 2" to 24", depending on job requirements. Maximum surface speed would be about 8000 feet per minute with most coloring operations performing best between 6000 and 7000 sfpm.

FULL DISC — SEWED:

They are constructed the same as full disc loose buffs with additional sewing added. The most common sewing used is $\frac{3}{8}$ " or $\frac{1}{4}$ " spaced spiral sewing. Sections are assembled on the arbor to the desired face thickness (Fig. 3).

The wheel formed has a firm surface and is suitable for cutting down operations. This type of wheel is best suited where the surfaces to be buffed are fairly even. Much more pressure will be exerted on the high spots, because the wheel will not conform to the contour of the work. Sometimes sewed and loose sections are alternated to form a somewhat more flexible buff. Because the sewed wheel is not very flexible, the length of the cut is short. When a short, fast cut is required, this type of wheel should be selected. Surface speeds to a maximum of 9000 feet per minute can be used.

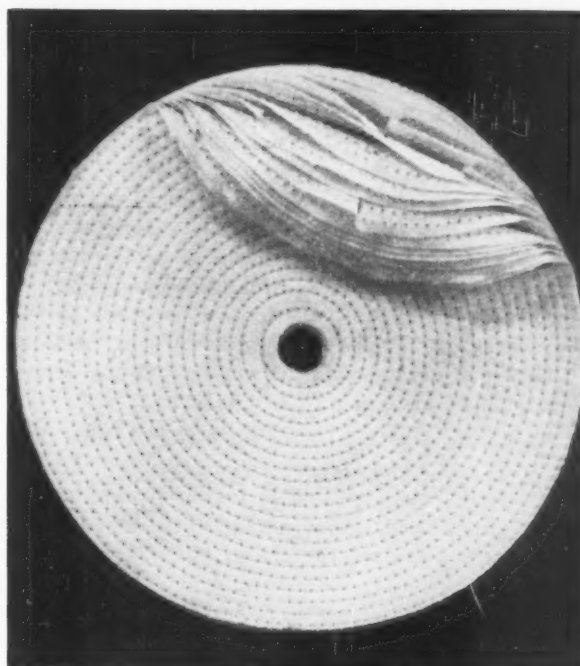


Fig. 4. Sewed Piece Buff.

SEWED PIECE BUFF:

These buffs are made by laying out pieces of material, edge to edge on a large table. A number of layers are laid up, one on top of another until a compressed thickness of about $\frac{3}{8}$ inch is obtained. Buff sections are then cut out of this layer and sewing is added (Fig. 4). Most common sewing is spiral, either $\frac{1}{4}$ " or $\frac{3}{8}$ " spaced. If good weight, close woven, new piece goods are used, a satisfactory buff can be produced. Very cheap piece buffs, using lightweight or otherwise unsatisfactory buff material, will not do an adequate job. Usually higher labor costs will result which will more than offset any saving made on price.

These buff sections are assembled to the proper face thickness on the lathe. They form an inexpensive sewed buff wheel that can be used on many cut down operations. Use primarily on hand buffing jobs, a fast cut can be obtained on all metals. One major disadvantage is that these buffs, due to the type of construction, are likely to run out of balance, causing vibration in the lathe and fatigue to the polisher. Comparing the full disc sewed to the sewed piece buff, the type of work is the deciding factor. On one hand, the material used for full disc buffs can be more closely regulated, the buffs are always in perfect balance, every two pieces are turned to give more even wear and hold compound more uniformly. On the other hand, a well made piece buff would cost approximately two-thirds the price of the full disc buff or less. Cost comparisons are the best way to determine which buff should be used. Any labor saving should also be taken into consideration.

POLISHING WHEELS:

A polishing wheel is a complete wheel consisting of sewed sections cemented together to the desired thickness. Either full disc sewed buffs or sewed piece buffs are used. Full disc sections form the most satisfactory polishing wheel. They are much easier to keep in bal-

ance and stand up longer than a piece buff wheel. Canvas discs are usually cemented on both sides of the polishing wheel to protect the sewing and help keep the edges from breaking down.

The polishing wheel is used for removal of metal. The periphery is covered with glue and, while the glue is still soft, the wheel is rolled in abrasive grain. This glue and abrasive is called a "head." After the glue is dry, the "head" is cracked with a bar to form square or diamond shaped cracks around the polishing surface. In operation, this grinding or polishing surface is resilient and flattens out on contact with the work. It may be in contact with the work for several inches, thus giving a fast cut without gouging.

The hardness of a polishing wheel is regulated principally by the sewing. Spiral sewing, varying from $\frac{1}{8}$ " to 1" can be used, as well as various spaced square sewing. In general, spiral sewing is used because of comparative price but the density of a square sewed wheel is more uniformly controlled and the saving on the overall polishing operation may more than pay for the additional cost of the wheel.

Polishing wheels are also constructed from solid felt of various densities and from other materials compressed and secured to a metal hub. The compress wheels, as they are called, can be shaped to the contour of the work and will hold the contour even under considerable working pressure.

Linear speeds up to 7000 fpm are used, with best results often obtained at lower speeds.

FOLDED BUFFS:

This buff is called by a number of names, including pocket buff, triplex, double, and triple fold. It is constructed by folding full round muslin discs into pie shaped segments (Fig. 6). A double fold buff uses seg-

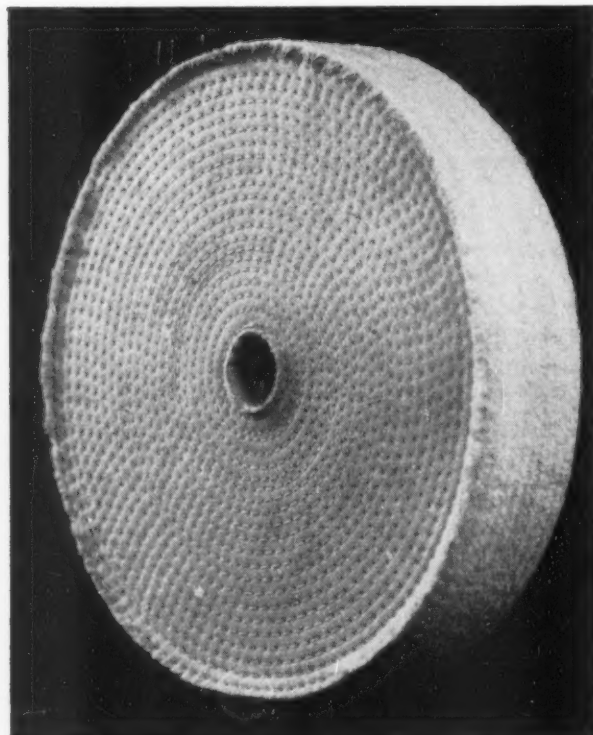


Fig. 5. Polishing Wheel.

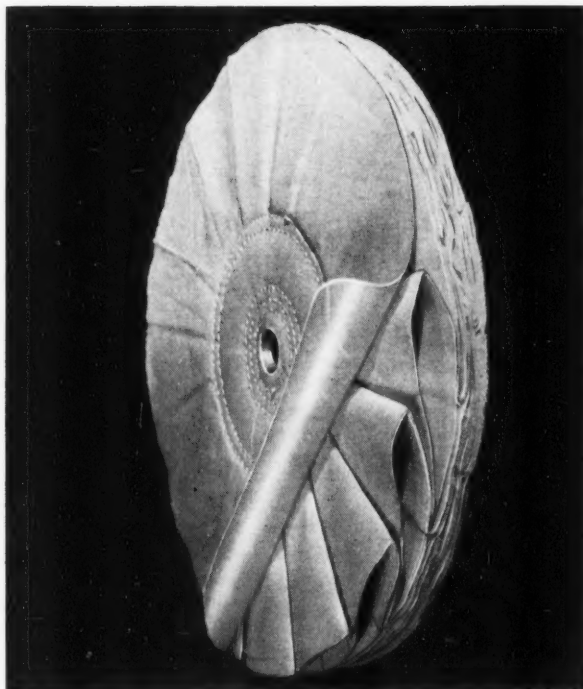


Fig. 6. Folded Buff.

ments folded two times and a triple fold buff would have the segments folded once more. Folding is done in such a way as to help keep the threads from unraveling. These fold pieces are laid to form a circle, with each segment overlapping the previous segment half way. Sewing is then added. The folds form pockets which hold compound and help cause an air circulation. The segments can flex, allowing a large area of contact with the work. The ability of the segments to flex results in less heat developed in the fabric itself and provides a cooler running buff.

The usual sewing is several rows slightly less than half way to the periphery, and additional sewing to give support to the arbor hole. Spiral sewing can be added if additional stiffness is required. The triple fold gives greater density than the double fold and is usually used if more cut is desired. Sections are assembled on the arbor to the proper face thickness.

Used where fast cut is required and heat must be kept low, the folded buff has been replaced in many instances by the bias type buff. Surface speeds vary widely, depending on the job.

SPACED OR PACKED BUFF:

Packing is accomplished by alternating large and small discs (Fig 7). The object is to obtain a softer, more flexible buff face. Used on plastics and flat work where mirror finish is required, the buff can be packed by the buff manufacturer or loose discs can be purchased and the consumer can pack his own wheel using worn down discs for spacers.

The most common packing is one or two small discs alternated with one large disc. More small discs can be used if an even softer face is desired. Sewing is normally one row around the arbor hole. One of the finer and lighter grade buff materials is usually used. This buff is used for the final operation to produce a high "color." The surface speed is generally under

7000 feet per minute and, depending on the material, may go as low as 4000 fpm.

FINGER BUFF:

The finger buff, first introduced in 1937, is constructed of many fingers of folded cloth (Fig. 8). These fingers extend radially from a metal center plate to which they are fastened. Variation of the type of fold changes the characteristics of the buff. Sewing can be added radially along the cloth finger to give added rigidity. The center size can also be varied to increase or decrease the flexibility. The material used can be either cotton cloth or a combination of cloth and sisal, the sisal being used to help produce a heavy, fast cut.

Because of its flexibility, the finger buff can be used on irregular shaped parts where sharp corners and edges must dig into the buff. On automatic machines, this feature may obviate special cams to position the work.

The cloth end of each finger is cut on the bias, which helps eliminate raveling. Air cooling and flexibility result in a cool, fast operation. Surface speeds in excess of 10,000 feet per minute can be used.

SISAL BUFF:

Sisal, because of its wide use, will be treated as a separate type of buff rather than as one of the buff materials. Sisal, a long, coarse fiber, is formed into twisted strands. These strands, resembling wrapping twine, are then woven into a cloth with approximately five strands per inch in one direction and seven strands per inch the other direction (Fig. 9).

From this cloth, a full disc type buff can be made using either all sisal, alternate sisal and cotton cloth plies, or sisal with a disc of cotton cloth on each side of the buff. These sections are then spirally sewed to

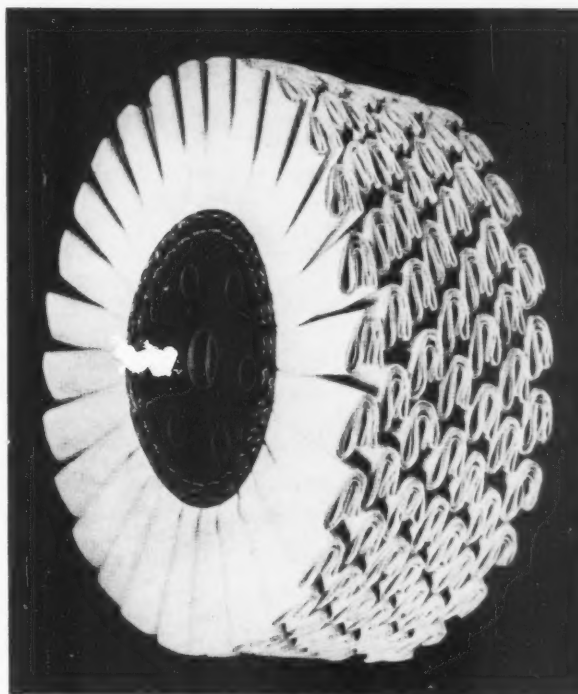


Fig. 8. Finger Buff.

form a stiff, coarse buff section. Sisal sections can be dipped in various treatments to stiffen the buff and help it to hold compound. A colored dye is usually added at the time for easy identification.

Sisal cloth is also cut into bias strips and wound into bias buffs. These buffs are also sewed to the edge and give a long wearing buff combined with the advantages of air cooling. Finger buffs also combine muslin and sisal.

Sisal buffs are used for a rough, fast cut, primarily on steel, but can also be used on other metals. Steel stampings and deep drawn steel parts are polished with one or more sisal buff operations and then finished with a cotton cloth buff. This method leaves the steel with a high finish. If it is to be plated, bright nickel can be deposited directly onto the steel. Sisal buff operations, where they can be used, are very much faster and more economical than if cloth buffs were used throughout.

JEWELERS TYPE BUFF:

These buffs are constructed of full discs to the face thickness required for the job. They are used on a threaded tapered spindle and more than one section cannot be built up on the shaft (Fig. 10). Construction is similar to the full disc buff. Every two plies are turned slightly to provide even wear, and the total ply is determined by the thickness required. Sizes from 4" to 8" diameter are most common, but buffs can be made as small as 2" diameter or as large as 12". Buffs larger than 8", however, tend to tear at the center hole due to the torque developed. Once the center hole is torn, the buff is useless on a tapered spindle.

Sewing should be concentric, as described under sewing. Machine sewing can be used up to approximately $\frac{7}{8}$ " of thickness. If a wider buff is necessary, hand stitching may be used. Hand sewing is not generally recommended because of high cost.

Materials can be any type depending on job to be



Fig. 7. Packed Buff.



Fig. 9. Sisal Buff.

done. The center is generally hardened with a special preparation which impregnates the cloth out to the center row of sewing. Where it is desirable to keep the buff secured near the end of the spindle, additional center reinforcing is available at little extra cost as follows:

Leather center jewelers buff:

Same construction as above with a leather disc added at center on both sides of buff. Leather disc and buff center are then double hardened with a special preparation forming a tough core around the small arbor hole. This buff will not tear loose from the tapered spindle even under unusual conditions.

Lead center jewelers buff:

Also the same construction as the jewelers buff. After sewing, a lead core is poured into the center of the buff. The leather center buff, plus improved hardening methods, have made the lead center almost obsolete.

INTERNAL FINISHING BUFFS:

These buffs are all constructed using full disc cotton material. Various methods of fabrication are used to help form the different shapes. Several basic principles are followed in most cases to give the best results. These are fully described in an article published in the June, 1953 issue of METAL FINISHING, reprints of which are available.

These buffs are used on tapered spindles because the side or end of the buff is part of the buffing surface (Fig. 11). There is a great difference in the surface speed of the buffing surface as it goes from the center to the periphery. This limits the outside diameter to about six inches. Since much of the buff is in contact with the work at the same time, too much heat is developed if high speeds are used.

Using the proper working speeds and the right compound, these internal finishing buffs can do fast and economical jobs on surfaces that other buffs cannot even reach.

WOOLEN BUFFS:

As the name implies, this buff is constructed from woolen material. The most desirable kind of cloth is the type from which men's winter weight worsted suits are made. Constructed similarly to the jewelers buff, they are made to the desired thickness in diameters from 2" to 10" only.

The primary use of the wool buff is for a light cut and color operation on sterling silver. It has been found that a wool buff operation does a fast job and will not result in the tarnishing of the silver. It is not generally recommended for other metals.

SHEEPSKIN AND WHITE ALUM BUFFS:

These are cut from sheepskin which has been either bark tanned (russet sheepskin) or alum tanned (white alum). Buffs are made for tapered spindles with concentric sewing, or loose discs are sold to be assembled on the arbor of the lathe.

The use is principally on metals that contain lead. These metals, sometimes called slush metals, are difficult to buff with cloth because the surface of the metal seems to drag or smear. Buffs made from russet sheepskin or white alum do not cause this condition. The russet is used frequently with pumice in a "bobbing" operation. The white alum is used with rouges for the final finish.

Types of Materials

The table below lists the most common materials used for buffing purposes. Many other similar materials are used in smaller quantities but the characteristics of those shown are best suited for all buffing purposes. The thread count, designated by the numerals separated by the diagonal line (i.e. 64/68) refer to the number of threads per inch in each direction. The weight refers to the number of linear yards required

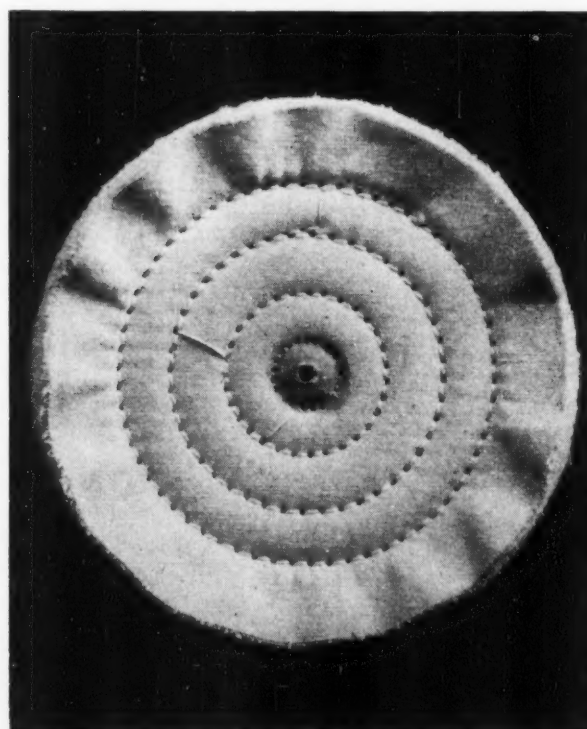


Fig. 10. Jewelers Buff.

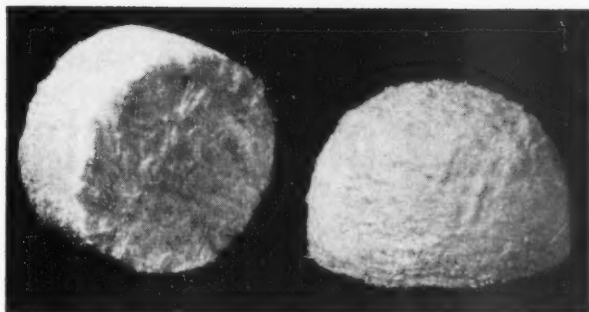


Fig. 11. Internal Buffs.

to weigh one pound. The fewer yards per pound, the heavier the material. Some are classified as sheetings, some are classified as print cloths. The 86/93 was developed by the mills for the buff trade and is classified as buff cloth. This is by far the most popular material and is the only one made principally for the buff trade.

Thread Count	Weight Linear Yds. Per Pound	Width	Characteristics
86/93 (unbleached)	2.50	40"	Close woven, high thread count, heavy weight. A sturdy, long wearing cloth. Makes a comparatively hard buff. Best for most cutting operations.
86/93 treated (yellow or maize cloth)			A combination of hard waxes, plus a color for identification, are added by a bleachery. Cloth is stiffer than the unbleached, 86/93; a very hard buff results.
64/68 (64/64)	3.15	40"	A medium thread count sheeting. Good for light cutting, buffing wheels; most general purpose work. Holds compound well but cannot compare with 86/93 for wear.
80/92	3.50	40"	A light weight, high count print cloth made from fine long staple cotton. Used on softer metals for light cut and color. Also used on plastics.
8 oz. Canton Flannel	2 yds.	34"	A medium weight flannel with nap on one side. Makes a soft buff for high color. For softer metals and plastics.

Cloth Treatments

These include bleaching, starching, treating with a combination of hard waxes, and other more specialized treatments. One buff manufacturer impregnates with materials which are the same as those used as binders

for buffing compounds. It is claimed that the buff holds compound better because of the natural affinity between buff and compound.

Treatment with starch creates a very stiff material that has no flexibility. This buff material cannot be used where heat is a problem. Treatment with hard waxes, usually dyed yellow, gives a stiffer buff than unbleached cloth. Because the waxes provide some lubrication, the buff does not run as hot as the bleached material. Still another treatment produces a cloth which holds greaseless compound better than the unbleached material.

Many treatments which are given to cloth to impart some special characteristic also weaken the cloth and make it more tender. The tear strength and flexibility, both of which are essential for buff material, are usually decreased in the process. For this reason a universal treatment for buff material has not been found. Records show that the use of unbleached cotton cloth far exceeds the total of all specially treated cloths.

Sewing

Of the many types of sewing available, most fall into a few basic categories. Regardless of the type of sewing, the following requirements are fundamental. The thread used, both top thread and bobbin thread, must be of adequate strength for the job requirement. The number of stitches per inch must be sufficient. Failure of either of these two requirements will result in shorter buff life and unsatisfactory results. Basic types of sewing are as follows:

SEWED ONCE:

Illustrated by the full disc loose buff. The primary
(Concluded on page 70)

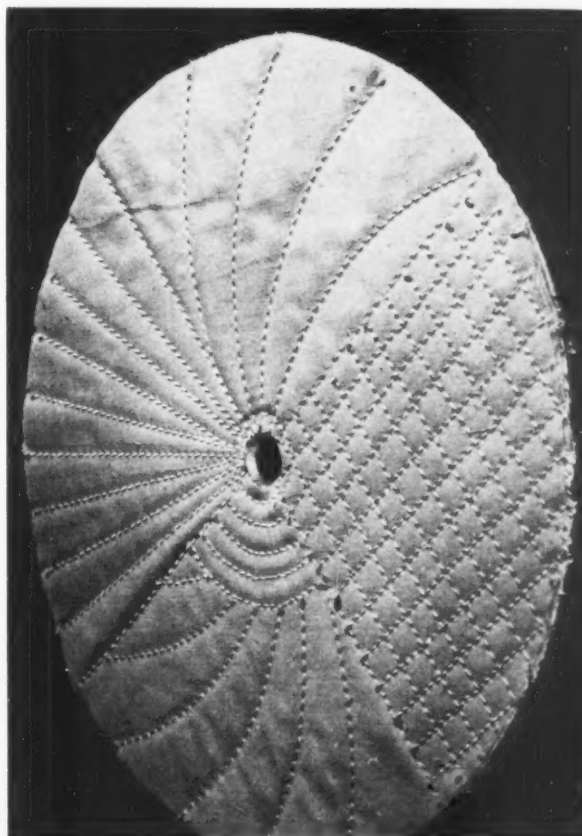


Fig. 12. Buff showing various types of sewing.

Surface Treatment and Finishing of Light Metals

Part XII-B. Plating on Aluminum—Anodic Oxidation Processes

By S. Wernick, Ph.D., M.Sc., F.R.I.C., F.I.M. and R. Pinner, B.Sc.

A NUMBER of processes have been patented¹¹⁻¹⁷ which depend upon electroplating on top of anodized aluminum, making use of anodic coatings obtained in a number of electrolytes, including phosphoric acid, oxalic acid, chromic acid, sulphuric-hydrochloric acid, sodium carbonate, etc. Of these only the first two are of industrial importance today and will be described in detail.

The Phosphoric-acid Processes

The original process using phosphoric acid was developed in Germany under the name of the Elytal process¹⁸ and consisted in anodizing for 10 to 15 minutes in a 30 per cent phosphoric acid solution, followed by cathodic treatment in an alkaline bath and subsequent copper or nickel plating. This process was not used in Germany to any great extent, mainly due to its higher cost compared to the zincate process and to

the pretreatment by etching process, but was further developed by the Aluminum Co. of America.¹⁹

In this modification, a variety of solution compositions were used depending on the alloy composition. For example, for the 3S aluminum-manganese alloy (1.25 per cent Mn), a solution containing 354 g./l. phosphoric acid was used at 32°C. and 12 amp./sq. ft. for 10 min. The adjustment of concentration and operating conditions facilitated coatings which were sufficiently porous to avoid the need for "modification" (i.e., partial dissolution of the oxide coating) before electroplating.

This process was developed further by B. E. Bunce¹⁰ who applied it to electroplating razor parts and investigated the optimum anodizing conditions for plating on a range of alloy compositions before electrodepositing copper, nickel or silver.

The best results for anodizing aluminum and a number of wrought alloys before nickel plating is shown in Table 3. The various plating sequences that can be used are shown in Fig. 1.

Bunce advocates the following cleaning solution (after treatment in trichlorethylene):

Caustic soda	10 g./l.
Sodium carbonate	15 "
Trisodium phosphate	15 "
Sodium metasilicate	2 "
Wetting Agent	0.1 per cent

Where chemical polishing is suitable, Bunce used a solution containing:

Phosphoric acid (d 1.70)	80% (vol.)
Nitric acid (d 1.42)	5%
Acetic acid, glacial	15%
Cetyl pyridinium bromide (wetting agent)	0.02%

at 80 to 90°C. for 1 to 5 minutes, depending on the initial state of the surface.

After chemical polishing, black smut is removed where necessary (i.e., from copper-containing alloys) by immersion in concentrated nitric acid.

The thickness and the nature of the film produced by anodic oxidation (see Table 3) are dependent on the conditions for anodizing, namely voltage, temperature, time, etc., and can be worked out to suit a particular article or aluminum alloy. The objective is to produce an anodic film with optimum porosity. Usually porosity

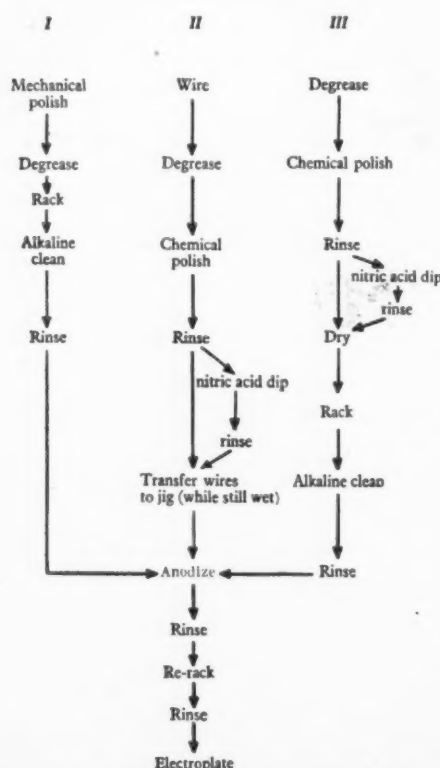


Fig. 1. Various cleaning and plating sequences which can be used on aluminum.

TABLE 3
Phosphoric Acid Anodizing Conditions
Applicable to the Treatment of Small Articles
Prior to:

<i>(a) Nickel Plating</i>					
<i>Alloy</i>	<i>H₂PO₄</i>	<i>Time (min.)</i>	<i>Temp. °F.</i>	<i>C.D. amp. per sq. ft.</i>	<i>Approx. voltage</i>
B.S. SIC	500	10	90	12	20
B.S. NS3	350	10	90	12	24
B.S. 6L1	350	15	74	18	26
D.T.D. 634 ..	350	10	90	12	20
	500	10	95	28	22
D.T.D. 443 ..	350	10	90	12-18	18
<i>Castings</i>					
B.S. L33	350	10	90	15	20
B.S.L.M. 18M	350	15	90	12	15
D.T.D. 272 ..	350	15	90	12	10
<i>(b) Pyrophosphate Copper Plating</i>					
B.S. SIC	350	10	90	12	26
B.S. NS3	350	10	90	15	25
D.T.D. 273 ..	350	15	74	18	26
B.S. 6L1	350	15	74	18	26
D.T.D. 634 ..	350	15	90	18	34
<i>Castings</i>					
B.S.L.M. 18M	250	15	90	12	28
D.T.D. 298 ..	350	15	80	18	20
D.T.D. 272 ..	250	15	80	12	15
<i>(c) Silver Plating</i>					
B.S. SIC	350	10	80	12	28
B.S. NS3	350	10	80	12	30
D.T.D. 273 ..	350	15	70	14	35
D.T.D. 634 ..	350	10	80	12	32
D.T.D. 443 ..	350	10	90	12-18	18

will increase with increase in the acid content of the bath and temperature, and will decrease with voltage and current density. Temperature range is usually within 65° to 95°F., time of immersion 10 to 15 minutes, and voltage 20 to 40. The current density will vary from 12 to 30 amp. per sq. ft.

The anodic coating appears first as a dark, almost black, deposit, presumably due to its very finely divided state. Initially it may be present as fine fibers which help in the production of the desired porous condition of the anodic film.

Bunce points out that, while it is possible to apply nickel, copper, cadmium and silver directly over the oxide film, there is an inherent danger that if the plating solution is too highly alkaline it will attack the oxide film before the metal is deposited. This may occur particularly with hot alkaline copper solutions, and in order to plate copper, brass or other metals from strongly alkaline solutions an initial undercoating of copper from a pyrophosphate solution is advocated.

The phosphoric acid anodizing process is sensitive to comparatively small changes in composition of the aluminum alloy which is being treated. As the metal purity increases beyond that of commercial aluminum, so does it become less susceptible to anodizing treatment and consequently more difficult to plate. For this reason the phosphoric acid anodizing treatment has not

been successfully applied on diecasting alloys as a rule. A possible exception is L33 which has been successfully plated directly with bright nickel after phosphoric acid anodizing.

Plating Procedure

A typical silver bath which has been found useful for application on anodic coatings is as follows:

Silver cyanide	35 g./l.
Potassium cyanide	35 "
Potassium carbonate	40 "
Ammonium thiosulphate (60 per cent solution)	0.5 ml.

This bath is operated at approximately room temperature and the usual current densities employed in silver plating.

Nickel plating is usually applied using a Watts-type nickel solution, although bright nickels have also been successfully employed. Nickel plating can be followed by chromium plating without any special precautions being necessary in the intermediate phases.

Operating Conditions in Anodizing

The anodizing process itself has recently been the subject of an investigation by Spooner and Seraphim.²⁰ These authors found that the best results are obtained on aluminum in a solution containing 25 to 30 per cent phosphoric acid at 25°C., 10 to 20 amp. per sq. ft. and 30 to 60 volts for 10 minutes, during which time a coating of 3μ is built up. Strong agitation is recommended. The influence of anodizing time, phosphoric acid concentration and temperature on the coating weight is seen in Fig. 2.

Compared with anodic coatings obtained in sulphuric acid solution, the coatings obtained in phosphoric acid are much more easily soluble in the anodizing bath and are, therefore, appreciably thinner and of high porosity. At the same time, however, the barrier layer is thicker and this explains the apparently contrasting effect that the forming voltage required is rather higher. In subsequent electroplating, these authors found that the pyrophosphate copper bath, which is operated at approximately pH 7, is the most suitable plating solution, and microscopic investigation showed that the copper is deposited inside the pores of the coating. Fig. 3 shows a section of a copper-nickel-chromium deposit obtained on phosphoric acid-anodized aluminum.

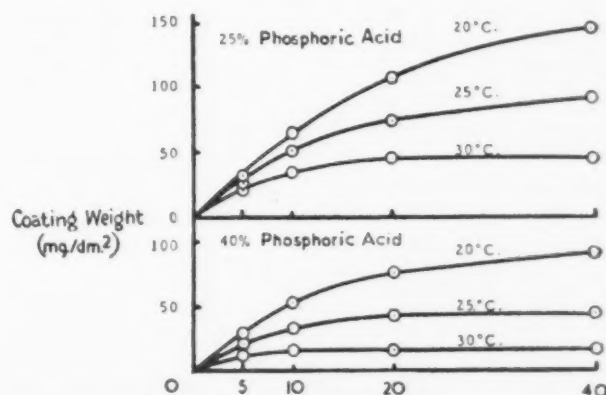


Fig. 2. Influence of anodizing time, phosphoric acid concentration and temperature on coating weight.

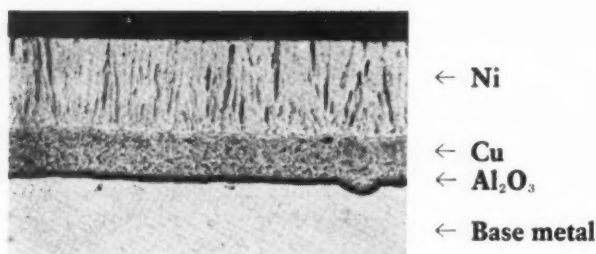


Fig. 3. Copper-nickel-chromium deposit on phosphoric acid-anodized aluminum. (The chromium layer is too thin to be seen.²⁰) (×750)

The Krome-Alume Process

Another well-known procedure is known as the "Krome-Alume" process.^{15, 21} This is based on the use of an electrolyte containing 3 to 5% oxalic acid in which a.c. or d.c. may be employed at relatively low current density (less than 5 amp. per sq. ft.). A voltage of about 5 is employed initially and is then quickly increased to 50 volts, the total time of treatment being about 10 minutes. The components are then thoroughly rinsed and the anodic film is "modified" in either cyanide solution or hydrofluoric acid. The object is to remove parts of the oxide film. A 6 per cent sodium cyanide solution may be used for this purpose at room temperature. Since the objective is to produce numerous pits or pores in the film of such dimensions as to allow sufficient anchorage of the deposit at the base of the pits, the time of immersion of the modifying solution is somewhat critical.

With the cyanide bath, up to 15 minutes of immersion may be necessary for pure aluminum, but for alloys the time may be very much less, e.g., for copper-bearing alloys as little as 5 seconds is all that is necessary as the oxide film produced is relatively thinner and more tenuous initially.

The hydrofluoric acid solution is usually employed in a very dilute form, containing 0.25 to 1 per cent by volume.

When the oxide film has been modified, the object is placed in the appropriate plating bath to receive the required deposit.

E. G. West¹ considers that the efficiency of the bond and the uniformity of the subsequent electrodeposit are dependent upon the uniformity of the anodic film, and this in turn is largely dependent on the preliminary cleaning and etching of the surface of the work. Hence, degreasing is followed, if necessary, by a nitric acid dip and then in every case by a suitable mild etching treatment which must not roughen the surface to any appreciable extent. To this end the following etching baths are advocated:

(a) A caustic soda solution containing 8 oz. per gal. employed at a temperature of 65° to 70°C.; immersion time of 3 to 10 seconds.

(b) A solution containing sodium carbonate 4.8 oz. per gal.; tri-sodium phosphate 4.8 oz. per gal. Temperature and time as (a) above.

The work is then rinsed in cold water, dipped in concentrated nitric acid for 10 seconds, again rinsed and transferred to the anodizing bath.

Alkaline Anodizing Pretreatment

Of some interest is an alkaline anodizing process,

the use of which has been described for a number of aluminum alloys.

In this process, the work is first pickled in a nitric-hydrofluoric acid bath of rather higher nitric acid concentration than is normally employed. The exact ratio is determined by trial and error in such a way as to remove as little aluminum as possible while removing the alloy constituents and impurities from the surface as far as possible. For this purpose a sample of the metal to be treated is immersed in concentrated nitric acid and hydrofluoric acid is added slowly until gas evolution begins. Nitric acid is then added once more until gassing just ceases.

These pickles, which contain over 90% conc. nitric acid and less than 10% hydrofluoric acid (50% by volume, contain no added water and are used for 10-30 seconds at room temperature.

After pickling, the work is anodized using a.c. in a solution containing sodium carbonate which, depending on alloy composition, may be used at very widely varying concentrations and operating conditions. In one example, an aluminum casting with a machined duralumin insert was plated in a bath containing sodium carbonate monohydrate 6 oz./gal. at 45 volts, a.c., 104°F. for 10 minutes prior to rinsing and cadmium plating in the standard bath. Normal nickel plating procedures can be applied directly after anodizing as can copper plating from the pyrophosphate bath.

The adhesion of the plated coatings is stated to exceed 8,300 p.s.i. while they will withstand bending and forming operations as well as heating to the melting point of the aluminum without exfoliation.

The corrosion resistance has been determined on aluminum plated with 0.5 mil cadmium and this combination has stood up to 500 hours standard salt spray without breakdown of the deposit.

Where copper is deposited for soldering, the unsoldered areas are best stripped in conc. nitric acid and the whole plated with cadmium for corrosion resistance.

Chemical Oxidation

As well as anodic coatings, chemically produced oxide coatings have been investigated as a base for electrodeposition. The results obtained with the M.B.V. process have already been referred to but the process has not been widely used in practice. Similar results are obtained after chemical oxidation in the very similar Alrok process.

Here chemical oxidation is carried out in a solution of the following composition:

Potassium dichromate	0.5 per cent
Sodium carbonate	2 " "

After a preliminary degreasing and cleaning, the components are oxidized in the above solution at a temperature of about 190°F. for about two minutes, and are then immersed in a concentrated nitric acid solution after rinsing. The objects are then again rinsed thoroughly and nickel plated, the work being usually subjected to a low-temperature heat treatment thereafter (200°C. for 1 hour).

As with the M.B.V. process, however, it is doubtful

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BARREL FINISHING EQUIPMENT

By J. B. Mohler, *Consultant*

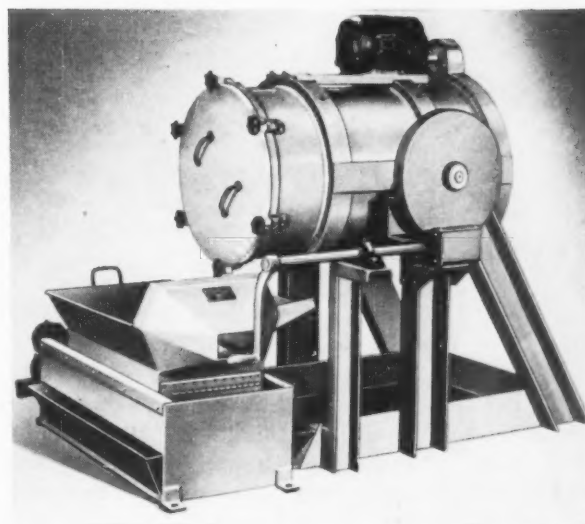
IN this mass production age, one is inclined to think of productivity in terms of an automatic screw machine or a full-automatic plating machine. The result is a mass of finished work. High productivity can also be obtained by batch treatment of a mass of work. Perhaps the analogy to popcorn is a good one. We continuously hear of turning out work "like popcorn." This is a common example of batch treatment of a mass. Mass treatment by means of rotating barrels is almost an obvious answer where it is necessary to process a large number of small parts. The major incentives are low man-hours and low investment for equipment and floor space.

Barrel finishing is widely used because of the cost advantage. Since it is a popular finishing method, it has been applied to many materials for a number of process treatments and finishes. It has been most successfully applied to the metals for cutting, burnishing, coloring, deburring, descaling, cleaning, and drying. Due to success with a number of finishes, it has been used for several process steps for the same parts. Also, it has been recognized that two steps may be combined so that some burnishing and a limited amount of cutting may be done at the same time. On the other hand, it has also been established that it is usually best to clean parts prior to barrel treatment if a good finish is desired.



Courtesy Almco Div., Queen Stove Works, Inc.

Figure 1. Open End Tumbling Barrel.



Courtesy Belke Mfg. Co.

Figure 2. Combination Burnishing Barrel and Separator.

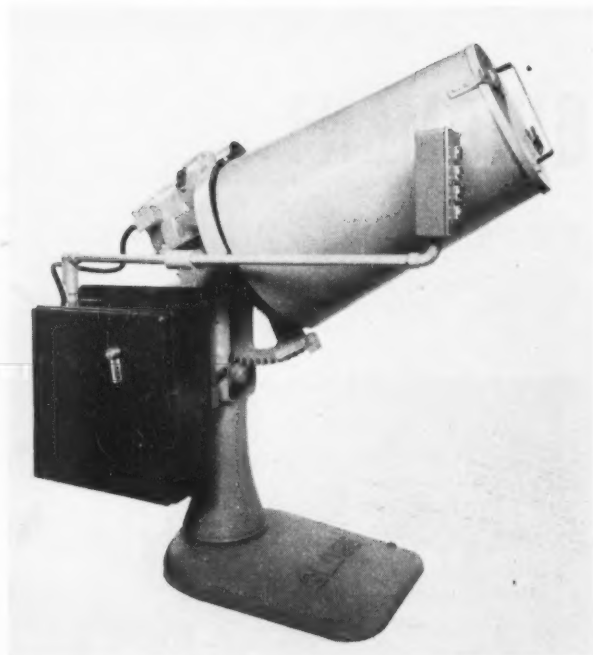
Much has been learned about the use of hardened steel balls for burnishing, abrasives for cutting, and compounded chemicals for wet finishing. Consequently these finishing processes have been applied to large work, in some cases to a single large part.

Fundamentally, all that is required for this type of finishing is a rotating barrel, the parts to be treated and a proper media. However, there is a good deal of difference in results with different types, sizes, and constructions of barrels. Consequently, it is well worth our time to take a look at the equipment that is available.

OPEN END TUMBLING BARREL:

It has long been a practice to dry small parts by hand dragging through a pile of sawdust. The sawdust removes surface water and, at the same time, wipes the surface dry to avoid water marks that are common for non-contact drying. This is done more efficiently by tumbling in a barrel of the type shown in Fig. 1. Such a method may be preferred for drying of parts after barrel plating; particularly where the parts do not have sufficient mass to dry naturally from the heat content absorbed in a hot rinse. Or, possibly, the parts contain water holding pockets that make tumbling necessary for complete drying.

This particular barrel is also used for processing of short-run parts and for parts where fine finishes and close tolerances are not required. The barrel is shown



Courtesy Casalbi Co.

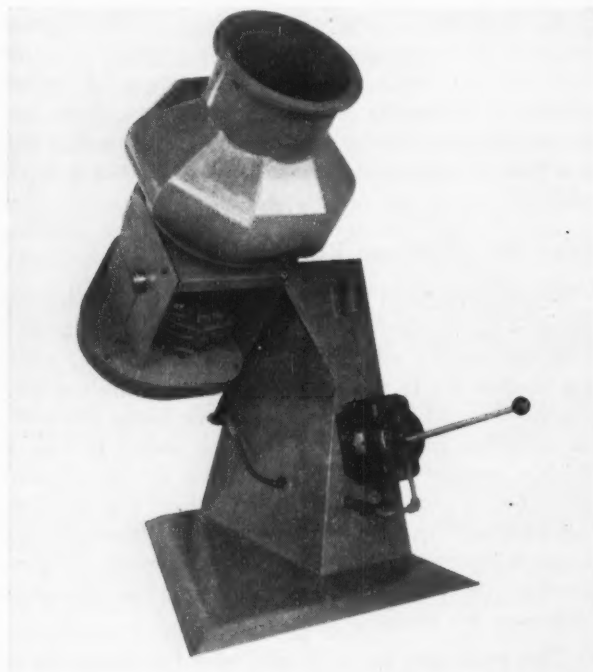
Figure 3. Direct Drive Tilting Barrel.

in the unloading position with the built-in motor driven screening unit folded out. This 24 R.P.M., 8.3 cubic foot capacity barrel is constructed with the typical sloping multiple sided construction used for many tilting barrels.

Tilting barrels of this and similar types are available with motorized or hand operated tilting and screening devices.

TILTING BURNISHING BARREL:

The barrel of Fig. 2 is a unitized, open-ended, tilting barrel, ruggedly constructed to withstand heavy duty



Courtesy The Baird Machine Co.

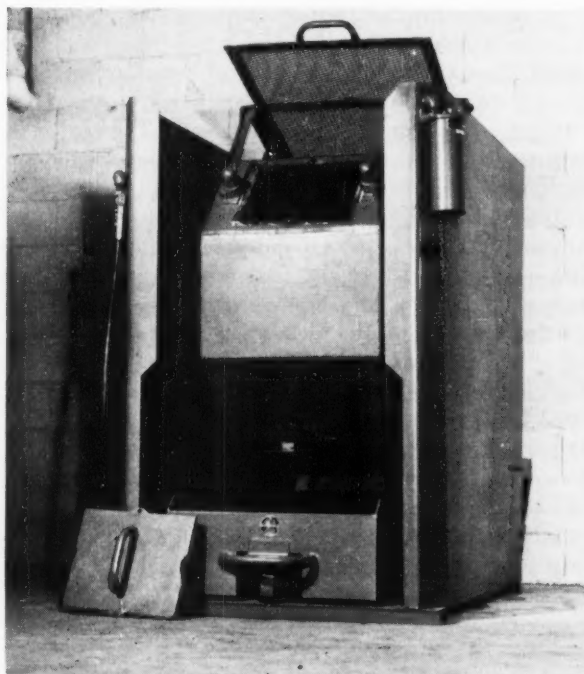
Figure 4. Bottle Shaped Barrel.

burnishing action. Insert, octagonal, wood liners are available where the protection of a wood lining and the tumbling action of an octagonal shape are desired. The barrel rotates at 36 R.P.M. and has a total capacity of 9.6 cu. ft. without the lining and 7.1 cu. ft. with the lining.

Tumbling action of the tilting barrels can be varied by changing the angle of the barrel. This tilting burnishing barrel combines a direct drive with a hand crank tilting device to take advantage of the tilting variable with one man operation.

A lighter duty direct drive barrel is shown in Fig. 3. This barrel is available with a wood or a steel shell and features a sloping bottom to move the load alternately forward and allow it to slide back during rotation.

The tilting or oblique barrels are used for dry burnishing of small parts. Loading and unloading is easy



Courtesy Roto-Finish Co.

Figure 5A. Narrow Horizontal Barrel.

through the open end. Also, it is a simple matter to stop the barrel and remove a few parts for inspection at any time.

BOTTLE SHAPED BARRELS:

An open end and horizontal tumbling action is obtained by the use of bottle shaped barrels. For maximum surface action the barrel may be operated horizontally while the feature of modified action by tilting is retained. An example is shown in Fig. 4. It is worthy of note that barrels of this type are removable, and that a variety of conventional and custom barrels may be mounted on the basic tilting tumbling machine.

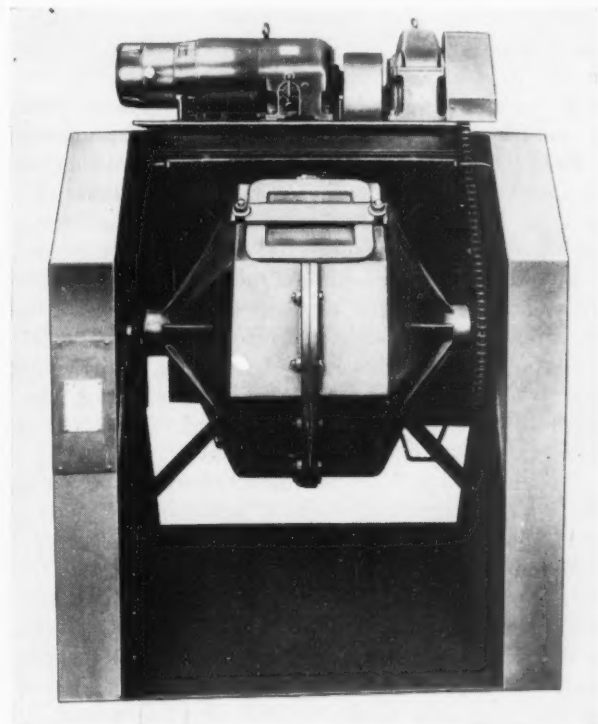
HORIZONTAL BARRELS:

Horizontal barrels are available with 6 to 12 sides, 8 inches to 8 feet in diameter, for work loads ranging from ounces to tons and processing times of minutes or days.

To obtain a desired finish, the ratio of media to work may be from 2 to 1 to 10 to 1. Dry burnishing, cutting, and coloring media may consist of hardened metal shapes, soft metals, abrasives, minerals, plastics, wood, ground corncobs, and synthetic inorganic materials. Quartz, granite, limestone, sea pebbles, flint, agate, alumina, and sand have all been used.

Wet tumbling may utilize one or more of these same materials in a lubricating and detergent, neutral, or etching solution. Mechanical finishes can be produced that are comparable to other finishing methods with the exception of final buffing with a wheel.

When the variables are considered, it is not surprising that a wide variety of finishes are obtained. Speed, load, ratio of work to media, type of media, size of media, mixed media, amount and type of solu-

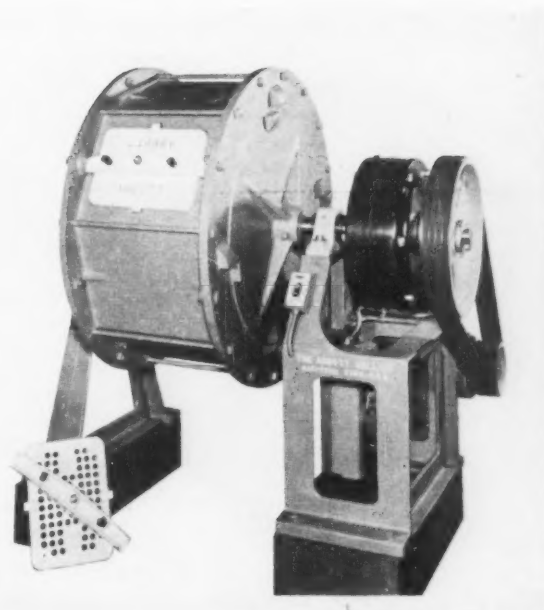


Courtesy Hartford Steel Ball Co.

Figure 5B. Triple Action Cutting Barrel.

tion, all exert an influence on the process. Tumbling in fixed or free fixtures as well as periodic reversal of the barrel rotation are further factors that widen the scope of finishing possibilities.

Immersion tumbling in conventional plating barrels is a part of barrel plating processes for cleaning and pickling of metal parts. Single purpose processes or non-electrolytic processes utilize the same type of equipment. Similar perforated horizontal barrels are used with solid media incorporated with the work where it is desirable to readily introduce and remove a solution. Solution contact and removal is accomplished merely by lifting a barrel into and out of the tank. Such a method facilitates rinsing or other processing steps, but has only been practiced with the smaller barrels. The perforated barrel of course restricts the use of some types of solid media.



Courtesy The Abbott Ball Company

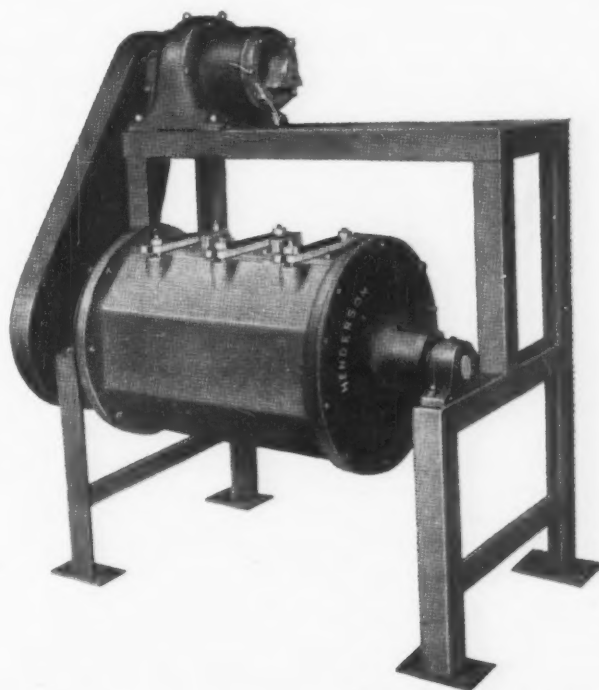
Figure 6. Belt Driven Barrel.

NARROW HORIZONTAL BARREL:

Side loading horizontal enclosed barrels are used for wet and dry tumbling. Large diameter barrels are used to obtain a satisfactory surface speed at low R.P.M. In order to take advantage of diameter it is necessary to use narrow barrels where loads are small.

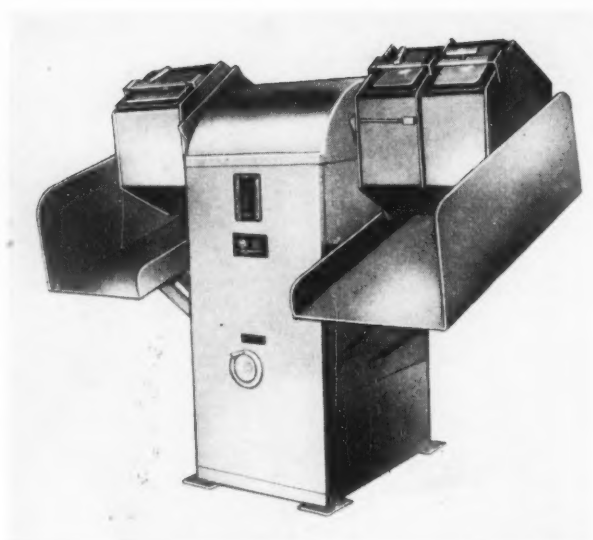
The lined steel barrel of Fig. 5A has a diameter of 36 inches. The barrel is available with a variable speed of 10 to 30 R.P.M., magnetic brake, automatic timer, reversing starter and remote control as optional equipment.

This type of barrel is available with conical ends for the purpose of adding another dimension to the motion



Courtesy Henderson Bros. Co.

Figure 7. Wide Horizontal Barrel.



Courtesy Rampe Mfg. Co.

Figure 8. Multiple Barrel and Single Barrel on a Common Drive.

of the parts and media. The conical end barrel, illustrated in Fig. 5B, is commonly known as a "triple action" barrel.

Variable speed is frequently provided with horizontal barrels in order to save operating time where higher speeds will not damage the work.

Steel barrels may be lined with rubber, plastic or wood. Rubber and plastic linings are preferred for long life and, in some cases, for corrosion resistance. Wood linings are often preferred because of easy replaceability.

A belt driven barrel is shown in Fig. 6. The bolted construction of the barrel is favorable for replacement of the wood lining and the entire barrel may be readily disassembled for replacement of other parts if necessary. The bolted construction is also used for two compartment barrels.

WIDE HORIZONTAL BARREL:

The wide horizontal barrels are among the oldest in use and have been subjected to numerous modifications for special purposes. With perforated sides and immersed in a tank of soap solution, they are the "tubbing barrels" universally employed for ball burnishing jewelry and similar small objects, although they have also been successful for burnishing silver flatware and holloware in large hotels and restaurants.

Constructed of cast iron, this type of barrel (Fig. 7) is especially adaptable for large, heavy work to be cut down or wet-ground, since it is extremely rugged and wear-resistant (some sold in 1905 are said to be still in use!). Bolted construction permits replacing the faster wearing side section without the necessity for purchasing new ends. In the larger sizes, the wide horizontal barrel is made with a full compartment width door, thus permitting insertion and removal of special fixtures, as in Fig. 9.

MULTIPLE COMPARTMENT BARREL:

A number of barrels can be driven from a single power source. The multiple unit will save in original cost and space. Such a unit is shown in Fig. 8. This particular unit drives three 17 inch diameter barrels.

The left barrel has a volume of $8\frac{1}{4}$ gallons and the two compartments on the right are 5 gallons each. The unit is available with lined or unlined barrels, push button starting, pressure safety closures and 12 to 36 R.P.M. variable drive.

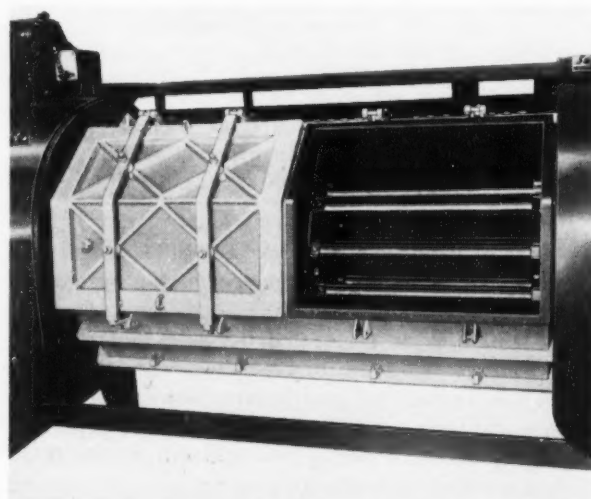
Accessory Equipment

A complete barrel finishing department will include accessory equipment which may be integrated, or separate from the machine. Separating screens are usually required. These may be hand or mechanically operated. Classifying screens may also be necessary where the media is broken down during use. Magnetic separation is convenient and sometimes a practical necessity where magnetic media or parts are tumbled. Loading and unloading pans, a hoist, water supply, rinse tank, safety guards, and scales may all be a part of the complete department.

An enclosed compartment barrel with separating screen tray to catch the work and the media is shown in Fig. 10. Unitized equipment of this type is available with various compartment capacities. Safety gate, screen trays, and chip pans are standard equipment.

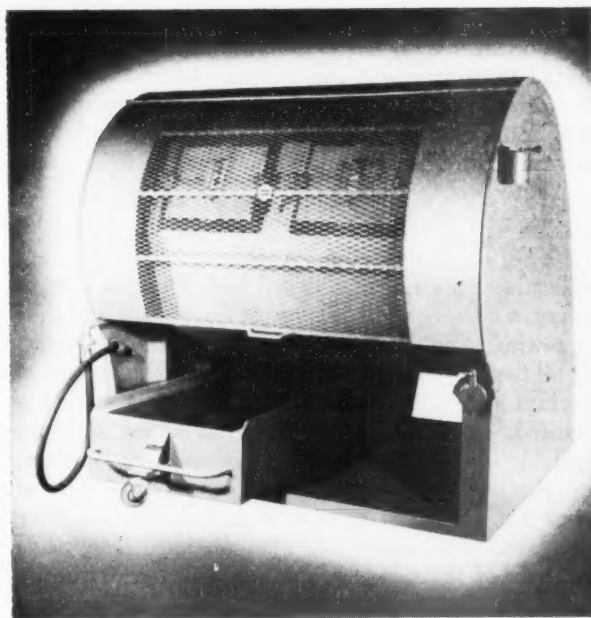
Barrel finishing of precision parts that cannot be allowed to tumble on one another can be done with fixtures. Deburring of a number of machined parts has been done by this means. The parts can be racked to hold them separated and the rack allowed to tumble. Or a fixture or number of fixtures can be fastened to the door, walls or other internal parts of the barrel. A fixture used for this type of finishing is shown in Fig. 9. When the work is held in a fixture of this type, the barrel is reversed after one-half of the processing time in order to obtain a uniform finish.

Barrel finishing is a mass contact operation. As such, the working, wearing, peening, abrading, or wiping of the surface of the pieces being finished is accompanied by surface action on the media and on the barrel itself. Thus, it can be a fairly rugged operation. Since the action takes place on all exposed surfaces, metal will either be worked or removed over the entire part. This is generally desirable, with the exception of an operation such as the removal of a heavy burr. If



Courtesy Almeo Div., Queen Stove Works, Inc.

Figure 9. Fixture for Deburring or Barrel Finishing of Precision Parts.



Courtesy Grav-i-Flo Corp.

Figure 10. Barrel Unit with Separating Tray.

the action literally wears away such a burr then, of course, the rest of the part will be excessively worn.

The expected amount of work to be done may be used as a guide for ordering equipment. Heavy duty work, such as peening, breaking of fins and flashing from castings, burnishing and polishing with hardened balls, may be done in steel barrels. Where the part itself may be damaged by contact with a hard surface, wooden liners are advisable. Rubber and plastic linings are resistant to abrasive wear and protect the barrel where corrosion is a factor.

If a barrel is to be selected for multiple purpose use, it is well to consider the type of duty expected. An oblique barrel is good for light duty service and ready inspection of the parts. A horizontal barrel will withstand heavy duty service. In either case, wet finishing should be considered because of the success with wet methods.

If a horizontal barrel is to be used for experimentation, a diameter of 18 inches and variable speed in the range of 10 to 40 R.P.M. will give results more easily converted to production practice than will a smaller barrel.

The choice of media is important. Whether the media be small or large it may readily be fractured and pounded to a smaller size. The high priced media may be the most economical. On the other hand, the hardest or the highest priced media do not necessarily guarantee the best results. Possibly a soft or a low priced media, frequently discarded or screened out, will give the best results in the shortest period of time.

For specific applications a great many technical articles are also available describing the general characteristics of barrel finishing.^{1,2}

Manufacturers of equipment, media, and compounds maintain laboratories for processing of parts as a basis for recommendations. Such manufacturers also have a backlog of experience on which to draw. If the problem is unusual there are many helping hands that would be glad to render aid and advice.

BARREL FINISHING COMBINATIONS				
CLASS	TYPE	MEDIA	ACTION	COMPOUND
HARD SHAPES	METAL	STEEL	BURNISHING	NEUTRAL
	MINERAL	GRANITE	DEBURRING	WET
SOFT SHAPES	METAL	ZINC	COLORING	ACID
	MINERAL	LIMESTONE	CUTTING	ALKALINE
HARD ABRASIVE	NATURAL	FLINT	DESCALING	WET
	SYNTHETIC	ALUMINA	CLEANING	DRY
SOFT ORGANIC	NATURAL	WOOD	WIPING	
	SYNTHETIC	PLASTIC		

Figure 11. Chart indicating combination of media and compounds that may be used for various types of finishing action. The combinations are not necessarily typical, but indicate the use of hard and soft media and suggest that other combinations are almost unlimited, as indicated in Table No. 1.

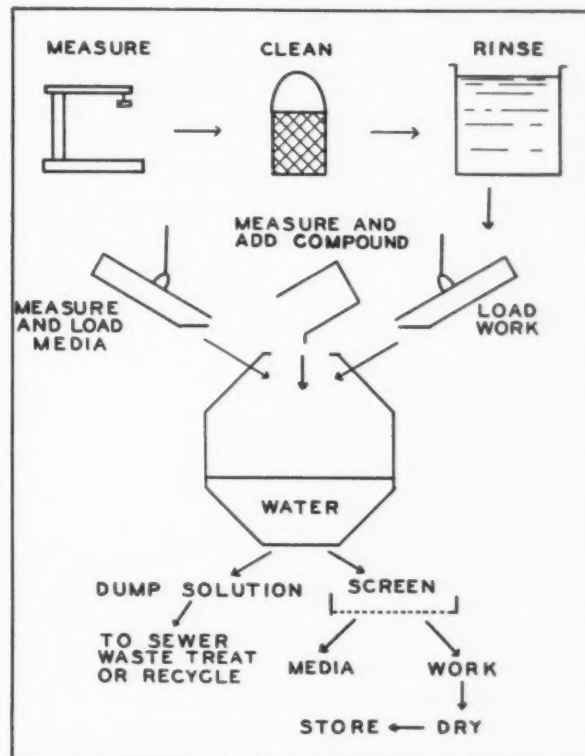


Figure 12. A typical barrel finishing cycle.



(Courtesy Speed-D-Burr Corp.)

Fig. 13. A Horizontal Barrel.

Barrel Finishing Variables

Types of equipment, media, wet and dry tumbling offer almost unlimited combinations for finishing possibilities.

BARREL:

Oblique

Polygonal — Bottle

Horizontal

Center loading — End loading
Sloping Ends — Compartmental
Submerged.

BARREL MATERIALS:

Wood

Cast iron

Steel

Wood lined — Rubber lined — Plastic lined

COMPOUND:

Neutral

Acid

Alkaline

MEDIA:

Hard Metal

Steel

Soft to Hard Metal

Steel — Bronze — Brass

Soft Metal

Zinc

Hard Inorganic Synthetics

Alumina — Porcelain — Glass

Hard Minerals

Granite — Quartz — Agate — Flint

Softer Minerals

Mica — Sea pebbles

Soft Minerals

Limestone

Synthetic Organics

Wood — Leather — Corn Cobs

Grit and Fines

Hard

Alumina — Emery — Volcanic Ash

Softer

Sand — Pumice

Soft

Limestone — Rouge

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BUFFS FOR ALL PURPOSES

(Concluded from page 61)

use of this sewing is to keep the buff section together while assembling on the lathe.

CONCENTRIC SEWED:

Illustrated by the jewelers type buff. Each row is a complete circle. Used extensively where the wheel is to

be used on a tapered spindle. This sewing can also be used on larger buffs where several additional rows are desired to provide a slight amount of stiffening. This type of sewing is usually specified by the number of rows desired but can also be identified by the space between rows. The maximum thickness practical would be slightly less than one inch.

SPIRAL SEWING:

Illustrated by full disc sewed buff. On this type of sewing, a complete row is made at the outside and then the sewing is automatically spiralled at a pre set spacing all the way to the center of the buff. Most common spacings are $\frac{1}{4}$ " and $\frac{3}{8}$ " apart. If a very stiff buff is required, $\frac{1}{8}$ " spacing can be used. Other spacings available are $\frac{1}{2}$ ", $\frac{3}{4}$ " and 1". Because of economy and practicability, this is the most common type of sewed buff employed. It is used on full disc and piece buffs and occasionally on bias sections. The usual thickness of the sections is $\frac{1}{4}$ ". This type of sewing is not generally recommended on sections thicker than $\frac{1}{2}$ " face. Thinner sections should be built up to the desired width.

SQUARE SEWING:

Illustrated on buff showing various sewings (Fig. 12). This type of sewing gives a very uniform density even as the buffs wear down, and is quite often used to form polishing wheels. The density can be regulated by the number of rows per inch. This type is considerably more costly than the spiral sewing because of the labor involved in the sewing operation. It should be used only if spiral sewing does not perform satisfactorily.

RADIAL SPOKE AND RADIAL ARC:

Also illustrated on buff showing various sewings (Fig. 12). Rows start at the center and run to the periphery, either in a straight line or in a wide arc. Usually used where a fast cut is required, this buff cannot be too stiff at periphery. Combinations of arc and concentric or spiral sewing are sometimes used (also illustrated). The sewing is designated by name and number of rows (i.e. spoke sewed, 16 rows). This is principally a special purpose sewing and should be used only if spiral sewing does not perform satisfactorily.

HAND SEWING:

A method of sewing very thick buffs, using heavy twine and perforating the material with a punch. Because of very high labor costs it is used only if absolutely essential.

From the buffs illustrated and described in the foregoing, a selection can be made to perform almost any buffing operation. Since the equipment available very often governs the selection, specific recommendations cannot be made without considering this factor. If recommendations are desired, the supplier should be furnished with complete information on available equipment, item to be buffed, and finish required. Samples showing the original condition and final finish will help a lot. Full advantage should be taken of the services that most reliable manufacturers are glad to render.

Finishing Pointers

Measuring Additions to a Bath

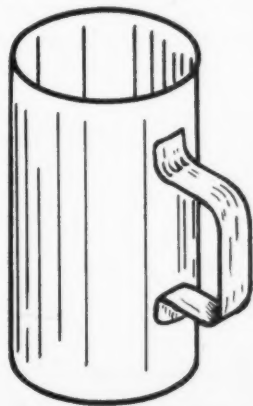
CONSISTENT results with a plating bath or a processing bath are dependent on frequent additions. The characteristics of a bath will gradually change due to build-up of impurities, such as carbonate in a cyanide bath. This is a natural change that can be corrected if necessary, but it is a slow change that does not cause a great difference in the bath from day to day. Sudden changes in the bath can take place due to large dilutions or large additions to the bath. Such sudden changes have caused both loss of control and loss of quality. These troubles can be avoided by frequent small additions.

Additions to a plating bath should be made often enough to assure that the bath will remain within the prescribed limits. The bath may be allowed to change until the concentration drops to the low limit and then corrected by adding enough chemicals to bring it to the high limit. The limits were originally set to tolerate this change. However, if there are any errors in analyses, additions, or solution level, this practice may result in exceeding the limits. Small errors will not, of course, be serious, but it is better practice to operate within the limits. If small additions are made bath changes will be minimized and errors will be of less account.

A schedule for additions is set from the known rate of change of a bath. Assume that, for a high pH Watts nickel bath, the limits for nickel sulfate are 24 to 32 oz./gal. and the rate of loss of nickel sulfate is 6 oz./gal. every two weeks. Set the limits at 25 to 31 to allow for errors and make additions at the rate of 3 oz./gal. per week. Analyze the bath for nickel every two weeks and make every other weekly addition with-

out an analysis. There are a number of advantages to a schedule of this type. Additions are made as a weekly practice, large bath changes are avoided, and it is not necessary to run an analysis for every addition. The small additions and the narrower limits allow for deviations from the estimated concentration due to errors.

Since small errors are allowable, it will be conve-



nient to make additions to a bath on a volume basis. If the above nickel bath is a 400 gallon tank then 25 pounds will be required for one oz./gal. Weigh 25 pounds of nickel sulfate into a sufficiently large bucket, level off and place a mark on the inside of the bucket. Now one oz./gal. equals one bucket filled to the mark. All the plater does is add 3 such additions once each week. In some plants these additions are made at the end of the week so that the bath can be stirred and allowed to set over the week-end. After the chemicals are in solution and well stirred, a sample can be taken for analysis. From the analysis the bath is occasionally adjusted and the rate of additions is modified if necessary.

Where smaller additions are made, such as addition agents, it is convenient to make a special container that can be filled level full. Assume that an addition agent is added in quantities of 0.1 oz./gal. to the nickel bath. This would require 2.5 pounds. Weigh 2.5 pounds into a container and from the level calculate the volume. Make a container that will hold this volume level full. A container, as shown in the sketch, a dipper or other shape may be used.

Many plating baths, cleaners and other processing baths have been controlled by this method. One distinct advantage is that responsibility is placed for regular additions. The use of a calibrated container simplifies the procedure and eliminates the weighing step. If it is carefully done, the error in the addition should not be over 10 percent and an error of this magnitude is acceptable for small additions.

SURFACE TREATMENT AND FINISHING

(Concluded from page 64)

whether this process has much commercial significance.

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Science for Electroplaters

19. Polarization — I.

By L. Serota

ELECTROLYTIC processes such as electroplating and electrocleaning deal with the passage of current through solutions (electrolytes). The effect of the impressed e.m.f. upon the changes occurring at the electrodes, and upon the flow of current, is typified by the action taking place in a dilute sulfuric acid solution containing smooth platinum electrodes. If the e.m.f. of the battery for this electrolysis is less than 1.7 volts, a momentary current flow that may be indicated by a galvanometer (sensitive ammeter) will soon decrease and virtually drop to zero. If the battery is now removed and a wire used to complete the circuit, the ammeter, it will be observed, will deflect in the opposite direction, indicating a current flow counter to that of the electrolyzing solution. This effect, which continues for a while after the battery has been removed, is due to the fact that some of the gases formed (hydrogen at the cathode and oxygen at the anode) are not released at the respective electrodes but, instead, are adsorbed by the electrodes. The platinum electrodes, therefore, act as gas electrodes and acquire a potential which, together with the electrolyte (sulfuric acid), form a voltaic cell possessing a certain electromotive force (e.m.f.) which opposes that of the battery. This counter (back) e.m.f. is the polarization electromotive force, and the electrodes are said to be polarized.

Glasstone defines polarization as "... any departure of an electrode from equilibrium conditions no matter what the cause." Kronsbein considers polarization as due to any "deviation of current distribution from the primary current distribution." The polarization e.m.f. is equal and opposite to the applied voltage, if measured at the moment when the battery is taken out of the circuit for this electrolysis, will be found to be about 1.7 volts. This is evidently the minimum voltage or e.m.f. necessary to discharge hydrogen on the cathode and oxygen on the anode from sulfuric acid on smooth platinum electrodes. If, during a plating operation, the anode polarization is high, the anode does not dissolve readily and it is considered to be passive. Such condition will arise with pure nickel anodes if the plating solution contains little or no chloride, or in a copper or silver cyanide bath that is low in free cyanide. Another instance of polarization is the formation of lead peroxide on the lead anodes in a chromic acid bath. Here polarization is helpful, since the lead peroxide oxidizes the trivalent chromium to chromic acid (hexavalent chromium).

Concentration Polarization

Polarization will also occur when changes in concentration result during electrolysis in the region of the electrodes. With a cell consisting of copper electrodes as anode and cathode in a copper sulfate solution, as electrolysis proceeds the positively charged copper ions in the solution next to the cathode will be neutralized and deposited, resulting in a decrease in the concentration of copper ions and copper sulfate in that area. At the anode, copper is dissolved; hence the concentration of copper ions and copper sulfate in the vicinity of this electrode is increased. The potential of the anode becomes more positive (noble) and the cathode more negative. The result is a copper

sulfate concentration cell which will produce an e.m.f. counter to that of the electrolytic current. Such change in potential is known as concentration polarization.

To equalize such differences in concentration the copper ions may be transported to the cathode area (also called cathode film) from the main portion of the plating solution, by the current or by diffusion. A small part of the ions deposited on the cathode is carried by the current. The hydrogen ions from the acid usually present, because they move at a faster rate, will account for most of the current to the cathode. Replacement, therefore, of the copper ions that are removed at the cathode depends principally on diffusion. A decrease in polarization may be attained by stirring, by increasing the concentration or by increasing the bath temperature. It is also attained by the chloride ion or hydrogen peroxide in nickel solutions, free cyanide in a copper or silver cyanide bath, rochelle salts in copper solutions, or caustic soda in tin solutions. The term depolarization refers to this function.

Decomposition Voltage

Although the normal electrode potential of oxygen is given as 1.23 volts with respect to the normal hydrogen electrode, an external electromotive force of 1.7 volts is required in the electrolysis of sulfuric acid to liberate hydrogen on the cathode and oxygen on the anode. The additional e.m.f. (1.70 - 1.23) is that required to overcome the back e.m.f. Allowance must be made for the IR or voltage drop through the resistance of the solution, which is usually small. A measurable current or electrolysis will not result, therefore, unless the applied e.m.f. is greater, (as in this example 1.7 volts) than the back e.m.f. This voltage is known as the decomposition voltage and is defined as the lowest external electromotive force that must be applied so that a separation of cations

TABLE 1

Decomposition Voltages of Acids and Bases in Aqueous Solutions

Acid	Volts	Base	Volts
H ₃ PO ₄	1.70	N(CH ₃) ₄ OH	1.74
HNO ₃	1.69	NH ₄ OH	1.74
H ₂ SO ₄	1.67	NaOH	1.69
CCl ₃ COOH	1.66	NH ₂ (C ₂ H ₅)OH	1.62
HClO ₄	1.65	KOH	1.67

and anions at the electrodes will permit a continuous flow of current through the solution.

Similarly, smooth platinum electrodes in a molar solution of copper sulfate in molar sulfuric acid will exhibit the phenomenon of polarization if the e.m.f. applied from a battery is less than 1.355 volts. Here, too, a momentary current flow will decrease rapidly and drop nearly to zero, and a reverse current flow will result if the battery is disconnected and a wire used between the electrodes to complete the circuit. During the passage of current (electrolysis) the copper ions (Cu^{++}) are deposited as metallic copper on the cathode: $2\text{Cu}^{++} + 4e \rightarrow 2\text{Cu}^0$ (reduction). At the anode, hydroxyl ions lose electrons, forming water and oxygen: $4\text{OH}^- \rightarrow \text{O}_2 + 2\text{H}_2\text{O} + 4e$ (oxidation). The effect of these changes is a decrease in copper ion concentration in the cathode film, thereby lowering the potential of the copper ion — copper system; a decrease in the hydroxyl ion concentration; and greater concentration of oxygen on the anode, so that the potential of hydroxyl ion — oxygen system is raised. The potential at the cathode is -0.345 volt and at the anode 1.70 volts. The counter e.m.f. or net cell reaction is equal to the difference between these two potentials: $+1.70 - (+0.345) = 1.70 - 0.345 = 1.355$ volts. For electrolysis to proceed in this solution, the applied e.m.f. must exceed 1.355 volts.

Fig. 86 is a schematic representation of the theoretical decomposition voltage. The heavy line marked N. H. E. represents the potential of the normal hydrogen electrode, which is arbitrarily chosen as 0.00 volt. The distance ab represents the potential of the cupric ion-copper half cell, $+0.345$ volt. Distance cd the potential of the hydroxyl ion-oxygen half cell, $+1.70$ volts. The difference, 1.355 volts, is the decomposition voltage.

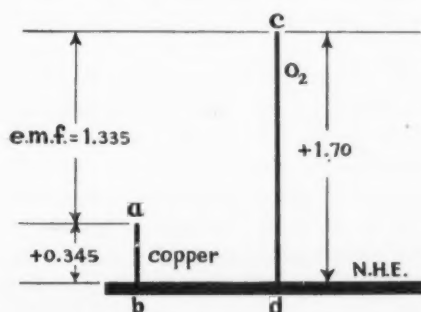


Fig. 86

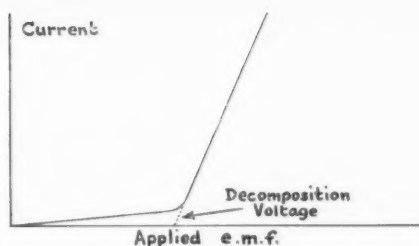


Fig. 87

If, on the basis of experimental determinations, current is plotted against applied voltage, a gradual increase in the electromotive force will show practically no current getting through the solution until the decomposition voltage value is reached. This is known as the diffusion current. No reaction product appears at the cathode in this range. It is, therefore, below the plating range. At the decomposition voltage stage, a rapid increase in current, indicated on the ammeter, will result without much further increase in voltage. This is the normal plating range. The point on the applied e.m.f. voltage axis at which the curve rises sharply corresponds to the decomposition voltage of the electrolyte in the cell, Fig. 87. Anode polarization and decomposition potential for a copper anode in a copper cyanide bath may be indicated diagrammatically as in Fig. 88. Point E is the equilibrium potential (zero current density). Point D is the decomposition potential, which represents the point on the curve when copper begins to dissolve at 100 per cent efficiency. Excessive polarization begins at Point P, and films begin to form on the copper anode. Here, it will be observed, a rapid increase in potential occurs. This represents the limiting or maximum rate at which the ion can be discharged and is known as the limiting current density. When the current density requires a voltage corresponding to point O, oxygen is liberated exclusively. At this point and above it on the curve the anode efficiency is zero.

This method was effective in demonstrating that different solutions (aqueous) of acids and bases will show a constant decomposition voltage with the passage of current through any of the electrolytes. It is close to 1.7 volts with smooth platinum electrodes. The results indicate that the same electrolytic process occurred in each case. Since water is common to all solutions, Le Blanc concluded that decomposition of water accounts for the discharge of

hydrogen ions at the cathode and the discharge of hydroxyl ions at the anode with the liberation of oxygen. The decomposition voltages of some acids and bases in Table I are those given by Glasstone. The decomposition voltage of a normal solution of hydrochloric acid, however, is 1.31 volts instead of the 1.7 volts for the acids. Also in this electrolysis chlorine is liberated at the anode instead of oxygen. The chlorine ion, apparently, will be discharged more readily than the hydroxyl ion. Since the value 1.31 volts corresponds closely to the theoretical value for the chloride ion half-cell, polarization evidently is small in the discharge of this ion on smooth platinum electrodes. Decomposition of the hydrochloric acid instead of water will therefore occur during this electrolytic process. If the electrolysis is continued the decomposition voltage will rise to about 1.7 volts, water will be electrolyzed, and the gas liberated at the anode will be, in large amounts, oxygen. This is a striking indication of the effect of polarization for, in the electrolysis of the other acids, the discharge of the hydroxyl ion and the liberation of oxygen took place at the anode. If polarization did not occur, the hydroxyl ion, with a theoretical discharge voltage of 1.2 volts, would be discharged before the chloride ion, which has a discharge potential of 1.31 volts.

Overvoltage

The decomposition voltage of an aqueous solution of an acid or base, which was shown to be 1.7 volts when smooth platinum electrodes were used, will exhibit different values with other metallic electrodes. For example, a higher voltage must be applied to decompose a solution of sulfuric acid when a platinum anode and a copper cathode are used instead of two plati-

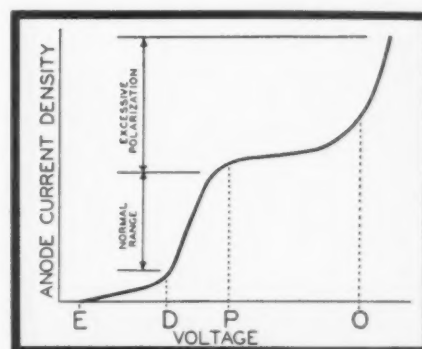


Fig. 88 Anode Polarization

TABLE 2

Electrode	Overvoltage
Platinum (platinized)	0.005
Platinum (polished)	0.09
Silver	0.15
Nickel	0.21
Copper	0.23
Tin	0.53
Lead	0.64
Zinc	0.70
Mercury	0.78

num electrodes. A platinum electrode is used for the anode because it will not interfere (react) with the solution.

The excess voltage or difference between the reversible gas electrode potential at which the evolution of the gas begins in the electrolysis is called *overvoltage*. The higher reading, according to A. L. Ferguson, is made up of the sum of the equilibrium potentials of the electrodes, polarization at both electrodes and the IR drop through the solution and circuit. This value (potential E) may be represented by Ohm's Law as $E = E_0 + IR + E_v$, where E_0 is the theoretical decomposition voltage, IR is the voltage drop through the solution (resistance R), and E_v is the overvoltage. The cathode overvoltages for different metals when used as electrodes for the electrolysis of normal sulfuric acid, according to Findlay, are those given in Table 2. Similar values for the oxygen (anodic) overvoltage are known. Such values may vary because of difficulties encountered in reproducing precise results. The cathodic overvoltage for hydrogen

on a platinized platinum electrode is also recorded as 0.00 volt.

This phenomenon of overvoltage, though known previously, was first studied in 1899 in a systematic manner by Caspari, who introduced the term overvoltage. The original term used was "überspanning," which was translated as overpotential or overvoltage.

In addition to the changes in overvoltages for different electrodes, A. L. Ferguson listed various factors relating to overvoltage that are encountered in plating operations. An increase in current density; time; the presence of colloidal addition agents; formation of film on the electrodes; decrease in metal ion concentration; or the formation of complex ions — any of these factors will result in an increased voltage. A decrease in overvoltage occurs with an increase in temperature; rough electrode surface; agitation; greater metal ion concentration; superimposing an alternating current; or the presence of depolarizing agents (free cyanide in a silver cyanide bath).

Formation of new products at the electrode resulting from electrolytic action, introduces another type of polarization or overvoltage. The potential developed by such products opposes the applied bath potential as, for instance, the formation of hydrogen at the cathode and oxygen at the anode or film formation on the anode, such as silver cyanide. Fine grain deposits are also associated with overvoltage.

The nature of the deposit when the

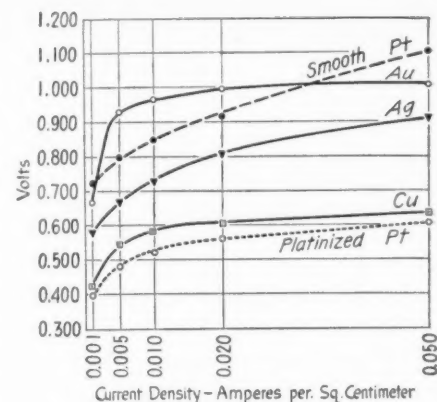


Fig. 89. Oxygen Overvoltages in Alkaline Solution at 25°

ion is discharged at the electrode is another factor relating to overvoltage. For a metal the overvoltage is relatively small. If a gas is discharged, however, the overvoltage is quite high. Higher temperatures decrease overvoltage by reducing the difference in concentration at the electrode because of the convection currents produced in the solution and the greater or increased mobility (speed) of the ions. This is, in effect, a stirring mechanism.

Colloidal matter, by increasing the viscosity of the solution, increases the difference in concentration at the electrode film, establishing a back potential or polarization, thereby increasing the resistance of this area. A more uniform distribution of current on all points of the cathode is thus attained, permitting metal to be plated in a depression or recessed area as well as on the surface. The same results may be accomplished by lowering the temperature or increasing the distance between the electrodes or the density of the current. The net effect is higher polarization for the shorter current path; hence, more current is forced through the longer path. Superimposed a-c on the d-c electrodes reduces polarization at anode and cathode as well as electrochemical passivity, thus acting as a depolarizer.

Increase in overvoltage is quite rapid for current densities from 0.00005 amp./cm.² up to 0.01 amp./cm.². For current densities beyond this range, the increase in overvoltage will not continue at such rapid rate. The variation in the cathodic overvoltage of hydrogen from dilute sulfuric acid solutions (up to 1 molar) for different metal cathodes at various current densities is given in Table 3. The values are shown graphically in Fig. 89. The graph also indicates the less rapid rate of overvoltage increase when current densities exceed 0.01 amp./cm.².

TABLE 3

CATHODIC OVERVOLTAGE FOR HYDROGEN IN ACID SOLUTION (VOLTS) AT 25°

Nature of Cathode	Current Density (Amp./cm. ²)					
	0.0001	0.001	0.002	0.005	0.010	0.050
Platinized platinum	0.0034	0.0154	0.0208	0.0272	0.0300	0.0376
Smooth platinum	....	0.024	0.034	0.051	0.068	0.186
Gold	0.122	0.241	....	0.332	0.390	0.507
Copper	0.351	0.479	....	0.548	0.584	0.68*
Silver	0.298	0.475	0.579	0.692	0.762	0.830
Tin	0.399	0.856	0.947	1.026	1.077	1.185
Iron	0.218	0.404	0.447	0.502	0.557	0.700
Zinc	....	0.716	0.726	0.726	0.746	0.926
Bismuth	....	0.780	....	0.980	1.05	1.15
Nickel	....	0.563	0.633	0.705	0.747	0.890
Lead	....	0.52	....	1.060	1.090	1.168
Cadmium	0.651	0.981	....	1.086	1.134	1.211

* Interpolated value.

SHOP PROBLEMS

ABRASIVE METHODS SURFACE TREATMENTS CONTROL
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METAL FINISHING publishes, each month, a portion of the inquiries answered as a service to subscribers. If any reader disagrees with the answers or knows of better or more information on the problem discussed, the information will be gratefully received and the sender's name will be kept confidential, if desired.

Plating on Aluminum-Bronze

Question: We have encountered considerable difficulty in silver plating a particular aluminum-bronze part of an aircraft engine. The part is composed of copper, aluminum, iron and tin in unknown proportions.

We would appreciate your advice as to whether good adhesion can be expected when electroplating over such an alloy. Please advise further as to recommended surface preparation, striking and plating procedures for silver plating this type metal. We have nickel, nickel chloride, muriatic acid, cyanide copper and cyanide silver strike baths in our shop.

F. M. M.

Answer: It is very difficult to obtain good adhesion of deposits on aluminum bronze because of the presence of aluminum oxide. If the alloy has less than about 7% aluminum, pickling in warm sulfuric acid solution is suggested. If over 7%, a subsequent mechanical treatment such as scratch brushing is needed to remove the oxides present.

After pickling, the use of the nickel chloride-muriatic acid strike is generally recommended prior to silver plating.

Conducting Plastics

Questions Will you please forward information on the conductive plastic mentioned on page 363 of the 1955 edition of the METAL FINISHING GUIDE-BOOK.

H. L.

Answer: A castable resin cement which conducts current and is claimed to be readily plated is offered by the Atlas Mineral Products Co. of Mertz-town, Pa. They call their material "Conductoplast."

Plating Spectacle Frames

Question: I have a problem which I would appreciate some help with. It involves the plating of bright nickel on spectacle frames of nickel silver (18%) which have been silver soldered by some method of induction heating. The heat leaves an oxide film which is easily removed by bright dipping, but I haven't as yet found a bright dip for the nickel silver which doesn't deaden the excess silver solder at the joints.

I have used a dip containing nitric, phosphoric and acetic acids which does a wonderful job on the nickel silver, but it deadens the silver solder to such an extent that the spots show through unless an excessive amount of plating is applied. As you know, nickel and its alloys are rather difficult to get good adhesion to unless some method of activation is used directly before plating.

I will appreciate any suggestions you can offer either in plating technique or a more suitable method of joining the frames together.

E. C.

Answer: Good results have been obtained on spectacle frames by a quick dip in the usual nitric-sulfuric bright dip, followed by a copper strike, prior to bright nickel plating. The copper strike not only covers the hard solder but ensures adhesion of the nickel deposit to the nickel-silver base.

Buffing Compound Removal

Question: In common with most other class ring manufacturers, after tripoli and also after rouge our rings are boiled out in soap, water and ammonia and then steamed. This may take from five to fifteen minutes and

does not always loosen the dirt in the crevices.

It is our understanding that some manufacturers have at one time, or do now, remove the polishing compounds by immersing in either cold or hot solvents. If this is correct we would very much appreciate it if you will advise the name of the solvent used, whether used hot or cold, and any other suggestions that you may have along these lines. Since many of our rings are either stone set and/or vitreous enameled, we trust that the recommendations that you may offer will not affect these materials.

The other day an ultrasonic cleaning device using detergents, ammonia, water, etc. was demonstrated to us which was not much more successful than our normal boiling out process. However, when this was used with a solvent, the compounds were removed in under thirty seconds.

S. S. S.

Answer: Solvent emulsions have been fairly successful for removal of packed buffing compound, if agitation is employed. These emulsions are obtainable from most manufacturers of cleaners and can be used at room temperature. However, best results are obtained by the use of organic solvents with ultrasonics. These units are offered by all the large manufacturers of solvent degreasers.

Pitting of Anodized Aluminum

Question: This firm is engaged in the manufacture of an electronic component called a Precision Potentiometer. This unit requires a main part made of 17ST or 24ST aluminum rod approximately 1 1/8" in diameter. We are presently encountering a great deal of difficulty in black anodizing this part by the sulphuric acid process.

Immediately after anodizing the machined part, the surfaces appear to have random minute blemishes which have the appearance of black pits. These bases are then washed and examined critically under a microscope. The above pits, under magnification,

have a black center surrounded by a white area, which in turn is surrounded by a larger greyish area. Ironically enough, other parts in the same anodized lot show no evidence of pitting, nor does the pitting occur in parts that have been clear anodized and not dyed black. Our electroplater, who does the anodizing on these parts, asserts that pitting is due to inclusions in the aluminum or from tools used to machine the part.

N. N.

Answer: Pit marks will be much more visible on black dyed anodized aluminum than on clear anodized films, since the sulfuric acid trapped in the pores causes salt formation on the surface, which stands out against the black.

The alloys employed contain 4% and 4½% copper respectively. Segregation of this copper may be a cause of pitting because of preferential attack during anodizing. The pitting may also be due to overcleaning or acid dipping. Unfortunately, it is difficult to determine which is the cause without a metallographic examination of the aluminum to determine the presence or absence of segregation.

Pitting in Dull Nickel Bath

Question: You helped me once and maybe you can do it again. In my room temperature dull nickel solution I'm experiencing pits on the high current areas most of the time, but I do get it on different parts of the object. However, more likely it happens on the high current areas like the end of gun barrels and the points of the frame. As I understand it, the solution has enough anti-pit ammonium chloride and I'm pretty sure boric acid. I know the salt concentration is a little high, but it never gave me that trouble. I notice that seconds or maybe 2 or 3 minutes from the time I put anything in to plate, something like oxygen bubbles hang to the metal and sometimes are hard to shake loose by agitation. Most of the pitting is caused at the place of the object that faces to the bottom of the tank.

D. R.

Answer: We would suggest that you have your nickel plating solution analyzed, as it may be out of balance. After analyzing and adjusting the bath, if pitting still persists, it can usually be eliminated by addition of about 4 fluid oz. of 100 volume hydrogen peroxide to each 100 gallons of solution.

Heavy Iron Deposits

Question: We have been experimentally electroplating iron from the double sulfate bath and have been encountering excessive roughness and pitting of the deposit. These two conditions, of course, do not occur simultaneously. When a new bath is made, we encounter pitting, whereas after plating for some time the roughness appears. The treeing is lessened by the use of anode bags, but not eliminated. We would like to know if this is a problem in electroforming and resizing, how it is eliminated, and whether a smooth deposit of ½" thickness can be obtained.

From the literature, it states that pitting can be overcome by the use of a suitable wetting agent such as Gardi-

nol WA. Can this be obtained from most plating supply houses?

C. R. H.

Answer: The double sulfate iron bath is generally employed for thin deposits. The ferrous chloride bath can be used for heavy deposits although we doubt if deposits can be obtained of ½" thickness, which will still be smooth even with constant filtration.

The usual practice is to remove the parts after about 50 or 60 mils have been deposited and smoothen the surface by filing, polishing, etc. This is repeated until the required thickness has been obtained. Roughness is a characteristic of heavy deposits and is minimized by bagging the anodes and filtering. Agitation is also desirable.

Gardinol wetting agents are produced by Proctor & Gamble.

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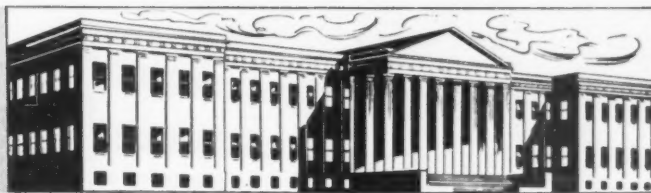
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Patents

RECENTLY GRANTED PATENTS IN THE METAL FINISHING FIELD



Wet Abrasive Dispenser

*U. S. Patent 2,742,738. Apr. 24, 1956.
G. L. Hall.*

A wet abrasive dispenser comprising a tank provided with a bottom and a top, a filling pipe extending an appreciable distance into said tank through which abrasive material is introduced into said tank, said filling pipe being provided with means for closing said pipe after said abrasive material is introduced into said tank, the end of said pipe within said tank normally limiting the level of said abrasive introduced through said pipe into said tank, a fluid inlet pipe entering said tank and through which fluid is passed into said tank under pressure to agitate said abrasive material and discharge same from said tank, said inlet pipe terminating with one end in the form of an orifice adjacent said bottom of said tank, a control valve connected to said inlet pipe for controlling the amount of said vehicle introduced into said tank through said inlet pipe, a fluid supply line connected to said control valve through which same passes, a wet abrasive dispensing pipe terminating inside said tank so that as said fluid agitates said abrasive material a mixture of said abrasive material and said fluid will pass out of said tank through said wet abrasive dispensing pipe, and nozzle means connected to said abrasive dispensing pipe for dispensing such mixture.

Electroformed Wave Guide

*U. S. Patent 2,742,930. Apr. 24, 1956.
W. B. Stoddard, Jr., assignor to The Champion Paper and Fiber Co.*

A slender seamless tubular metallic wave guide having metallic walls characterized by a microstructure characteristic of metal electrolytically deposited outward from the interior surface of the tubular structure and, integral therewith, a smooth surfaced seamless silver lining of thickness which is nowhere less than 0.0002 inch.

Phosphate Metal Coatings

*U. S. Patent 2,743,204. Apr. 24, 1956.
W. S. Russell, assignor to Parker Rust Proof Co.*

A solution for producing phosphate coatings on metallic surfaces consisting essentially of a phosphate of a metal selected from the group consisting of iron, zinc and manganese, and an acetic amino acid, said solution having a pH in the range of about 1.9 and 3.5.

Phosphate Conversion Coating

*U. S. Patent 2,743,205. April 24, 1956.
J. W. Condon, assignor to Westinghouse Electric Corp.*

An aqueous solution for treating metal surfaces in order to render them more active in the subsequent formation of phosphate coatings thereon, comprising as its essential components, from 0.001% to 0.6% by weight of lithium present as a compound thereof and at least 0.004% by weight of PO_4 present as an alkali orthophosphate, there being present from 1 to 125 parts of lithium for each 50 parts by weight of PO_4 , the lithium compound and alkali orthophosphate having been previously dissolved in water and evaporated to dryness.

Anodizing Aluminum

*U. S. Patent 2,743,221. April 24, 1956.
P. L. Sanford*

A process of coating aluminum and aluminum alloy articles with a hard and tough coating of oxide of aluminum which comprises passing an electric current through an electrolytic cell with said article forming the anode, and containing an electrolyte consisting essentially of an aqueous solution of an electro-anodizing acid and an acidic extract of a substance chosen from the group consisting of low grade coal, lignite and peat, said extract being obtained by cooking a mixture of said substance with water at a temperature of from about the boiling point of said mixture at atmospheric pressure to about 350° F.

Internal Anode

*U. S. Patent 2,743,229. April 24, 1956.
R. H. Hill and A. P. Knapp, said Hill assignor to the United States of America*

An anode for plating a uniform layer of metal on the bore surface of a tubular article comprising an upper portion having a copper core, a lower portion having a stiff core of material less conductive than copper, an annular copper portion encircling said stiff core in electrical connection with said copper core, said stiff core projecting beyond the lower end of said annular copper portion, and a protective lead casing about said copper core, said annular copper portion, and said projecting end portion of said stiff core.

Abrasive Bands

*U. S. Patent 2,743,559. May 1, 1956.
A. L. Ball and S. E. Lull, assignors to Bay State Abrasive Products Co.*

An endless, flexible abrasive band comprising an endless base and a spirally wound abrasive strip adhesively secured to said base, said strip having thereon a plurality of abrasive blocks.

Gas Plating

*U. S. Patent 2,743,700. May 1, 1956.
H. A. Toulmin, Jr., assignor to The Commonwealth Engineering Co. of Ohio.*

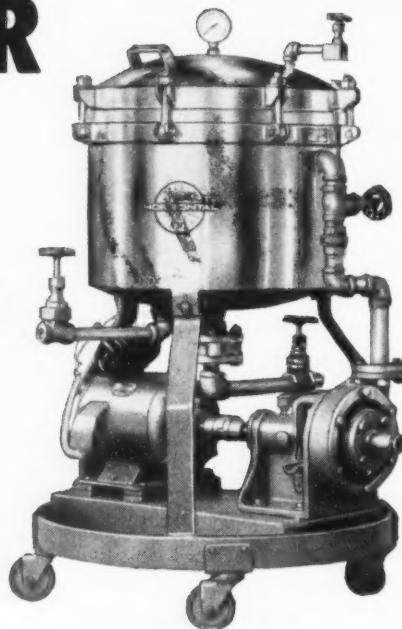
In continuous casting and gaseous metal plating apparatus for melting and continuously casting molten metal by flowing said metal into a mold and continuously withdrawing the hot metal as a solidified continuous length casting, the combination with means for holding and pouring molten metal including an open-end vertically disposed fluid cooled mold, of a gaseous metal plating chamber having passageways therethrough for the passage of hot solidified metal as withdrawn from said mold, said chamber being arranged to fit closely about said hot solidified metal casting, and conduit means communicating with said chamber for

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Where several tanks are to be filtered, the Sparkler filter can be shut down after filtering the first tank and moved to the next one without danger of disturbing the filter cake. This saves pre-coating time and filter aid usually required to re-coat a bag-type filter.

A filter cake on a horizontal plate will not crack, slip or fall off even with varying pressure or a complete shut-down of the filter. No pre-coat renewal is ever required after an interruption in operation.

When it is necessary to clean the filter, the Sparkler filter tank can be emptied in a matter of minutes with a minimum loss of valuable plating solution.

Any grade of filter paper from fine to coarse can be used in a Sparkler filter. This makes it ideal for carbon treatment of solutions. Carbon mixed with water in a stand-by tank is circulated through a clean set of filter paper on the plates until a carbon cake is formed. The solution requiring carbon treatment is then circulated through the carbon beds without contaminating the plating tank or a shutdown of plating operations.

At the end of the cycle with a Sparkler filter you can blow-down with air and produce a relatively dry cake that can be disposed of in a trash can rather than washing it down the drain with attendant sewer clogging problems.

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introducing a heat-decomposable gaseous metal compound into said chamber and in contact with said hot metal casting as the same is drawn from said mold and through said chamber, and power-driven means for withdrawing said casting from the mold and through said plating chamber.

Polishing Material

U. S. Patent 2,744,001. May 1, 1956.
C. G. Harman and R. Rose, assignors
to Rare Earths, Inc.

A polishing material consisting essentially of vitreous silica and a rare earth oxide.

Tin-Antimony-Copper Bath

U. S. Patent 2,774,063. May 1, 1956.
Q. O. Shockley, assignor to General
Motors Corp.

An aqueous bath for the electro-deposition of an alloy containing from about 2 to 12% antimony, from about 1 to 8% copper and the balance tin, said bath containing from 50 to 180 g./l. tin as tin fluoborate, from .5 to 20 g./l. antimony as a compound selected from the group consisting of antimony fluoborate, antimony trioxide, antimony trifluoride and potassium antimony tartrate, from .5 to 20 g./l. copper as copper fluoborate, from 10 to 40 g./l. boric acid and sufficient fluoboric acid to maintain the pH of said bath below 1.

Combination Cleaning and Phosphating Process

U. S. Patent 2,774,063. May 1, 1956.
A. Nicholson and C. F. Wilkinson, assignors to Parker Rust Proof Co.

A process for simultaneously cleaning and producing a phosphate coating on the surfaces of metal of the group consisting of iron and zinc and their alloys which comprises the steps of (1) applying to the surface an aqueous solution of an acidic phosphate of an alkali metal in the presence of an accelerator having an effect on the coating action substantially equal to that of about .5 per cent to 4 per cent chlorate, 1 per cent to 10 per cent of a hydrocarbon solvent, and a non-ionic oil-in-water emulsifying agent of the polyoxyethylene type having 3 to 25 polyoxyethylene groups therein in an amount sufficient to form a stable emulsion of said solvent, said solution having a pH of from 3.5 to 5.8 and continuing the application until a coating results, and (2) rinsing the coated sur-

face with a dilute solution of chromic acid.

Porcelain Enameling

*U. S. Patent 2,744,843. May 8, 1956.
B. G. Craig, assignor to A. O. Smith Corp.*

An improvement in the bonding of vitreous enamel to steel comprising applying a composition consisting essentially of weak arsenic acid to the surface of the steel to be covered with enamel, said acid having a concentration of less than 25% by weight and reacting with said steel to form a tightly adherent insoluble coating thereon, covering the coated steel with a glass composition, and subjecting the glass covered steel to a high temperature in the range of 1300° to 1600°F. to fuse the composition with the intermediate coating reacting with the glass to form a bond between said glass and the steel.

Plating Method

*U. S. Patent 2,744,859. May 8, 1956.
R. H. Rines.*

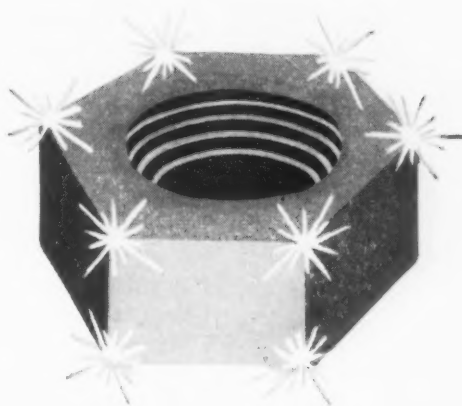
A method of electroplating an article disposed with an electrode in an electroplating solution that comprises producing a potential of magnitude less than the electroplating potential between the electrode and the article, producing an electron stream in a cathode-ray envelope provided with a wall comprising a conducting layer, disposing the wall close to the article, impinging the electron stream on selected regions of the wall, and adjusting the intensity of the impinged electron stream to control the plating of the article at the said regions.

Ultrasonic Plating

*U. S. Patent 2,744,860. May 8, 1956.
R. H. Rines.*

An electroplating method that comprises electroplating an article disposed in an electroplating solution, during the electroplating, producing sonic vibrations and applying the same to produce a relative vibration of molecular amplitude between a predetermined region of the article at which it is desired to produce a greater degree of vibration than at other regions of the article and a predetermined region of the solution at the surface between them, and confining the vibrations to periods of successive discreet pulses in order to prevent the formation of standing vibrational waves between the article and the solution.

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Sight Glass for Vacuum Chambers

U. S. Patent 2,745,131. May 15, 1956.
M. Auwarter, assignor to Alois Vogt.

The combination with a high vacuum chamber which in use is adapted to contain hot vapors of light-absorbing solid matter which condense and precipitate on the walls thereof, of means for allowing inspection of the interior of said chamber, comprising a transparent window in a wall of the chamber, a cleaning element arranged within said chamber to sweep over the window to remove condensed matter therefrom, means for actuating said cleaning element to move the same across the face of the window parallel to the plane of the window and in contact therewith, and a plate normally disposed in front of the window to shield the same and thereby minimize the quantity of vapor particles impinging on the window, said plate being movable by said actuating means from in front of the window to expose the latter, said cleaning element being disposed between the plate and the window.

Guard for Grinding or Polishing Wheels

U. S. Patent 2,745,230. May 15, 1956.
O. M. Krogsgaard.

A guard for a grinding wheel comprising a guard wall adapted to substantially enclose said wheel along its periphery to control the flow of grinding particles carried in the air current produced by rotation of said wheel, said guard wall having a front end wall positioned closely adjacent to the working place of said wheel and having a rearward section positioned remotely from said wheel with an aperture formed at the same level as and substantially opposite said working place, a guiding plate having one end thereof positioned substantially within said aperture and extending forwardly therefrom with the other end terminating adjacent to said front end wall, said front end wall having an inner concave portion extending above and below the front end of said guiding plate, said guiding plate being adapted to form a first channel between said guiding plate and said grinding wheel, a curving channel between said concave portion and the front edge of said guiding plate and a second channel between said guiding plate and said guard wall, said grinding wheel being

mounted for rotation and adapted to direct part of the air current rearwardly below said grinding wheel and through said aperture and to direct the other part of the air current forwardly through said first channel, around through said curved channel, rearwardly through said second channel and through said aperture, and said second channel having approximately the same area as the upper part of said aperture formed between said guiding plate and said guard wall.

Anodizing Aluminum

U. S. Patent 2,745,798. May 15, 1956.
B. R. Haveisen and F. A. Wales.

In the method of selectively forming a corrosion resistant coating on the exterior surfaces of the aluminum alloy portions of a composite aluminum steel strut internal combustion engine piston, the steps of placing said piston upright in a tubular porous shell supported in a vertical position and having an absorbent liner therein in contact with the sides of said piston, flooding the top of said piston with an acid electrolyte in regulated amounts and allowing the electrolyte to flow downwardly through said absorbent liner, connecting said porous shell as the cathode and said piston as the anode and passing an electric current therebetween so as to form said coating on the surfaces of said piston which are wet with said electrolyte, and providing circulating means for said electrolyte including means to maintain said electrolyte at a predetermined acid concentration and temperature.

Chromium Plating

U. S. Patent 2,745,801. May 15, 1956.
T. Blaine, assignor to The Harshaw Chemical Co.

A process capable of producing adherent chromium deposits of improved luster on bright surfaces of the class consisting of antimony, tin, silver and lead comprising electrolyzing between an anode surface and a bright cathode surface of the class consisting of bright antimony, bright tin, bright silver and bright lead surfaces, an aqueous solution essentially consisting of water, chromic acid, acetate ion and sulfate ion, acetate ion being present in concentration from about 15 to about 35% of the chromic acid by weight, sulfate ion being present to the extent of from about 0.3 to about 1.0 per cent of the chromic acid by weight and chromic

acid being present in concentration from about 100 to about 700 grams per liter.

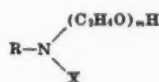
Corrosion Preventive

U. S. Patent 2,745,809. May 15, 1956. P. H. Cardwell and E. N. Alderman, Jr., assignors to The Dow Chemical Co.

A composition effective in combating corrosion of ferruginous materials consisting essentially of a mixture of (A) from 25 to 65 per cent by weight of at least one quaternary ammonium halide wherein all of the organic substituents are hydrocarbon radicals containing up to 18 carbon atoms, at least one of such radicals being an aliphatic hydrocarbon radical containing from 8 to 18 carbon atoms and each of two of such radicals being lower alkyl radicals having from 1 to 3 carbon atoms; (B) from 2 to 30 per cent by weight of at least one amine having the general formula:



wherein R represents a member of the class consisting of tertiary alkyl radicals having 18 to 24 carbon atoms and the hydrocarbon radical of a rosin amine; and (C) from 20 to 60 per cent by weight of at least one compound having the general formula:



wherein R is as aforesaid, X represents a member of the group consisting of hydrogen and the radical



and m and n represent integers whose sum is 8 to 21.

Pickling Waste Treatment

U. S. Patent 2,746,919. May 22, 1956. J. M. Wunderley.

An apparatus for treating waste pickle liquor comprising an elongated horizontal cylinder mounted for rotation about its longitudinal axis and having a charging opening at one end thereof and a discharge opening at the other end thereof, a hopper for introducing slag into said cylinder through said charging opening, a conduit extending through said opening for delivering a supply of liquor to be treated onto the surface of said slag, a spiral agitating vane comprising a coiled strip of several convolutions extending spirally of the interior surface of said cyl-

inder between the inner end of the conduit and discharge end of the cylinder for mixing the slag and liquor introduced therein and for moving the mixture to said discharge end, and a plurality of straight vanes respectively extending axially of said cylinder between adjacent convolutions of said spiral vane for increasing the mixing action on said slag and liquor and for slowing down its movement to said discharge opening.

Plating on Aluminum

U. S. Patent 2,745,799. May 15, 1956. J. Patrie, assignor to Pechiney Compagnie de Produits Chimiques et Electrometallurgiques.

Process of electrolytically coating aluminum and alloys thereof with other metals comprising the steps of: zinc plating the article in an aqueous alkaline solution consisting essentially of zincate, alkali cyanide and a cyanide of a heavy metal of the group consisting of copper, silver and cadmium, wherein the ratio of weight of the alkali cyanide to the heavy metal cyanide is greater than 4, and thereafter electrically depositing a metal other than zinc.

Iron Plating

U. S. Patent 2,745,800. May 15, 1956. J. Poor, assignor to Van Der Horst Corp. of America.

A process for electrodepositing iron which comprises electrolyzing an aqueous acid solution consisting essentially of ferrous iron, not more than 3 grams per liter of ferric iron, and at least 26 grams per liter of acid radical selected from the group consisting of chloride radical and a combination of chloride and sulphate radicals, in such combination the chloride radical being present in the amount of from 6½ to 100 grams per liter, and from 10 to 100 grams per liter of fluoborate radical.

Electropolishing Mask

U. S. Patent 2,745,805. May 15, 1956. H. Jones, Jr.

A masking device adapted to expose a substantially constant rectangular area of a specimen to a liquid etchant which comprises a sheet of material substantially resistant to said etchant having a port therein, a pair of parallel slideways on said sheet adjacent two opposite edges thereof, a pair of oppositely disposed first and second flat

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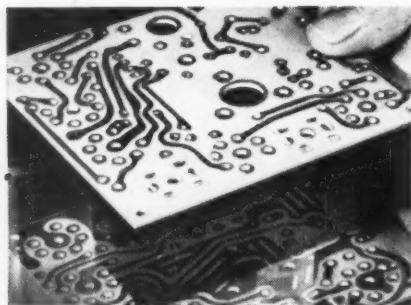
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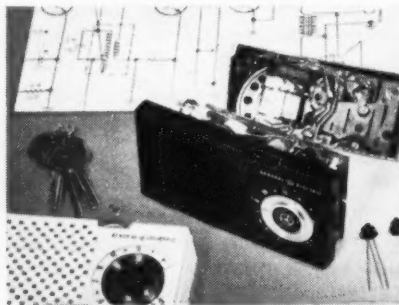
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A new 75-foot automatic acid-copper electroplating tank is the key to the highly mechanized production system in which General Electric will produce some 6,000,000 of its "Thru-Con"—additive-type printed-circuit boards for everything from transistorized portable radios to street light controls.

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shielding members having angularly disposed legs, each member being slidable rectilinearly on said sheet with the first leg of one shielding member in contact with one slideway and the first leg of the other shielding member in contact with the other slideway, the second leg of each shielding member being arranged in overlapping relationship with the first leg of the other shielding member whereby the overlapping legs are adapted to engage opposite sides of a specimen therebetween, the first leg of the first of said shielding members having an edge portion disposed at an oblique angle to the first of said slideways and the second leg of said first shielding member having an edge portion disposed at 90 degrees

to said first mentioned edge portion, and the first leg of the second of said shielding members having an edge portion disposed parallel to the said edge portion of the first leg of the first shielding member, the second leg of the second of said shielding members having an edge portion disposed parallel to the said edge portion of the second leg of the first shielding member, said edge portions defining a rectangular opening in communication with said port, the relative dimensions of which opening may be varied by sliding movement of one member relative to the other whereby the area of the specimen exposed through said opening when said overlapping legs are closed thereon is substantially constant.

Plating on Aluminum

U. S. Patent 2,746,136. May 22, 1956.
H. Richaud, assignor to Pechiney.

An article of aluminum and alloys thereof coated with a granular layer of nickel formed by chemical deposition and, superposed thereon, an adherent deposit of electrolytic lead, said lead deposit being free of blisters.

Bright Dip for Aluminum

U. S. Patent 2,746,849. May 22, 1956.
W. Helling, H. Neunzig, Johannes Rolie and R. Lattey.

A method for imparting high gloss to articles made of aluminum and its alloys comprising maintaining the said articles for a period of about 5 to 30 seconds at a temperature of 50 to 80° C., in an aqueous solution containing per liter 1.6 to 2.7 gram molecules of nitric acid, 1.8 to 3.5 gram molecules of ammonium, 3.5 to 7 gram molecules of hydrofluoric acid and from 25 times 10^{-5} to 25 times 10^{-4} gram molecules of lead nitrate.

Tin Flowing Oil

U. S. Patent 2,746,884. May 22, 1956.
L. Rosenstein and M. H. Gorin.

In a process of tinning metal plates by passing said plates through a body of molten tin, the step comprising passing the plates as they emerge from the body of molten tin through a body floating on said molten tin consisting essentially of a fatty non-drying oil which has dissolved therein, in an amount from 1% to 20%, a resinous substance selected from the group rosin, wood rosin, hydrogenated rosin, rosin esters, the rosin fraction of tall-oil, and rosin treated with paraformaldehyde.

ABSTRACTS

Surface Treatment of Light Metal I. C. Engine Pistons

A. Prati and F. Sacchi: *Alluminio* (Italy). Vol. 23, No. 2, pp. 139-144.

From reports in the technical literature and research investigations it follows that light metal pistons for four

cycle i.e. engines can be lead coated, tin coated and graphited. In the cases of diesel engine pistons however, it is not possible to use lead or tin coating since, because of the catalyzing action of the lead and tin, oil decomposition would occur.

Corrosion of Metals and Metal Coatings in Tropical and Sub-Tropical Climates

W. Machu: *Werkstoffe und Korrosion*. Vol. 5, No. 10, pp. 395-398.

In tropical climates extremely high temperature and humidity can occur, which can lead to particularly strong corrosion. The large temperature fluctuations between the maximum day temperature and the lowest night temperature are particularly dangerous, which can lead to the condensation of water vapor and corrosion under otherwise not particularly strong aggressive conditions.

Sweat corrosion troubles can occur even in transport, inside the packaging, and on storage. They are strongly accelerated by small amounts of chloride, mostly originating from atomized sea water. It is shown by an example which was closely investigated in detail, that attack in desert regions, far away from the sea, can also be considerably accelerated by salt-containing sand which is whipped up by the wind. Finally, a survey is given of the behaviour of various metals and metal coatings in tropical and sub-tropical climates.

Critical Consideration of Adhesion Test Methods for Plated Coatings

F. Sautter: *Metalloberflaeche*. Vol. 6, No. 4, B55.

The difficulty with a suitable adhesion test method for electroplate is that only those tensile forces should be determined which are necessary to separate the plate from the supporting sub-surface by rupture. If one considers the combinations of basis metals and the type and thickness of the plated coatings, then it immediately will be seen how great the difficulties are for a satisfactory determination, in the way of excluding, during the test, the shearing and bending forces as far as possible, which would otherwise interfere with a satisfactory test evaluation. The adhesion test is much



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easier to conduct with a weak bond because these secondary forces do not appear to any appreciable extent; with medium and strong bonds, the disturbing influence becomes much more marked to the extent where it can affect the test results.

A method was first developed by Ollard which endeavored to avoid this confliction. Using this method it was found by Roehl that considerable differences existed with the test results. Three factors are of special importance in the test: (1) Thickness of the plated coating; (2) Diameter of the hole in the test piece; (3) The play between the test part and the tube. It was considered that the shearing and bending forces could only be excluded

if the ratio of shearing surface to tensile surface amounted to 1.3. If this value drops below 1.3 then shearing occurs and, with much lower values, bending.

The test process developed by Knapp corresponds to the Ollard method. This method allows of application to flat surfaces. The test sheet, plated on both sides, is tested in the tensile machine. The deposit thickness is fairly important, and this should be chosen thick enough that neither bend or shear forces can occur, which would give low values. The thickness of the test sheet plated is also of considerable influence. Higher values were found with very thin sheets. With increasing thickness, the adhesion values approx-

imated the tensile strength of the basis metal. A minimum test thickness for aluminum was about 0.5 mm.

From these test methods examined it followed that the actual values of adhesion are never obtained. The question arises as to whether it is actually possible to measure the true adhesion. In spite of the careful thought given to the evolution of the various test methods, in no case could adhesion be measured which was greater than the tensile strength, either of the basis metal or of the coating.

Testing of Plated Coatings from the Standards Aspect

G. Schikorr: *Metallüberflaeche*, Vol. 6, No. 4, B57.

A critical comparison is presented of the various test methods for plated coatings according to standard specifications and the limitations and usefulness of these methods.

Thickness testing by the microscopic method, with consideration of all possibilities of errors, has certain fundamental limitations. For various reasons coatings of less than 0.002 mm. in thickness cannot be measured with sufficient certainty. Thus, this method is not suitable for the thickness measurement of the practically important bright chromium coatings. With the chemical thickness testing process, a general applicability is obtained when the thickness is calculated from the loss in weight by dissolving the deposit with a reagent which does not attack the basis metal. This method assumes, however, that the coating is of a uniform thickness which, in many cases, is a practical assumption which cannot always be relied on.

More widespread methods in use are those in which the deposit is dissolved, and the thickness of the coating judged by the reaction time. Bright chromium coatings are tested by allowing some drops of conc. hydrochloric acid to act on the test piece. With the flow process, a stream of reagent, the nature of which depends on the basis metal, impinges on the test piece at a determined velocity and rate. The time is determined at which the basis metal shows through which, as a rule, can be directly ascertained. The thickness is obtained by multiplication of the reaction time with a factor. This test is suitable for operational control, in which the nature of the plated metal

is known precisely. The coating thickness is ascertained in a few minutes on an area of a few sq. mm. However, the disadvantage is that the penetration time can be strongly influenced by the plating process and this is particularly the case with bright nickel coatings. The drop test is fundamentally similar. As a rule, drops at a speed of 100 drops per minute impinge on the test part. It is somewhat simpler than the flow process and is suitable for non-discontinuous testing.

In porosity testing, two types of pores must be considered; those which penetrate down to the basis metal and covered pores. It is necessary to be quite clear about this, as regards the testing. The Ferroxy process serves for pore testing on iron and steel. There are some ten variations of this test process. Copper sulfate solution is used for the testing of chromium-nickel-copper coatings on zinc die castings. A testing process for tin coatings on copper permits the location and a quantitative determination of the pores. The test part is immersed for a certain time in an ammoniacal ammonium persulfate solution; this turns blue with a porous coating. The intensity of the blue coloration is determined colorimetrically and offers a measurement of the porosity.

Colorimetric Determination of Iron in Hard Chromium Baths

By H. Pohl: *Metallüberflaeche*, Vol. 6, No. 9, B129.

Next to the sulfuric acid content, knowledge of the iron content is of the greatest importance for the satisfactory working of a hard chromium bath. Gravimetric determination of the iron takes a long time and the presence of trivalent chromium sulfate introduces considerable error. The Zimmermann-Reinhardt titrimetric method also requires a 2-3 times repeated precipitation to obtain satisfactory results. The suggested colorimetric iron determination method can be conducted in about 10 minutes and so is eminently suited for bath control purposes.

About 100-150 cc. are taken from the hard chromium bath and cooled down to 20°C. Then 5 cc. of this sample are pipetted into a 250 cc. volumetric flask and filled to mark. After shaking, a 5 cc. aliquot is placed in a 100 cc. volumetric flask, diluted to

about 70 cc., then 10 cc. of 10% potassium thiocyanate solution are added, the solution made up to the mark and, after shaking, is measured in a universal colorimeter. The iron content is read off from a standard curve. A yellow filter is used in the measurement to compensate to a great extent for the yellow coloration of the chromic acid.

The superiority of the colorimetric method was demonstrated by comparison analyses with the two classical processes. With this method, iron contents up to 17 g./l. can be determined with an error limit of a maximum of ± 0.05 g./l. in 10-15 minutes.

Hardness Measurements in Rhodium Plating

A. Keil and E. Merkle: *Metallüberflaeche*, Vol. 8, No. 9, A129.

Micro-hardness tests were conducted with the Leitz "Durimet" and the test load of 15-300 g. The measurement of the hardness impression was conducted at 400 times magnification. Precision data were obtained regarding the hardness of rhodium deposits. Comparison of these values with values obtained with normal macro-hardness testing is difficult because the production of sufficiently thick and crack-free coatings of rhodium to conduct this measurement is very difficult to realize. It is assumed that these micro-hardness test values are actually also macro-hardness values, as, with electroplated coatings, there is frequently no dependency of the hardness value on the load applied, but this has not yet been definitely proved.

For decorative purpose, i.e. corrosion-free silver coating, a rhodium deposit of 0.05 to 0.1 micron is usually applied, although 0.5 micron thick coating would seem to offer a more adequate protection. For technical purposes, a coating thickness of 0.5 to 5 microns is usually required, and the hardness determination is of importance, as the rhodium coatings are used for such purposes as contacts, etc. For decorative purposes too, the hardness and wear resistance of the thin rhodium coating which is used is also of considerable importance. In the case of relatively hard metal coatings on a softer basis metal, a general rule applied is that, for a correct hardness measurement, a coating thickness of 10 times the penetration depth of the hardness testing diamond is required and this rule was tested here where

extreme hardness differences exist between the coating and the coating metals. Tests were conducted giving measured values on a 6 microns thick rhodium coating on brass, with a rising load.

It was found that the true hardness of the rhodium coating is obtained in good agreement with the above rule only if the diamond penetration depths are less than 10% of the coating thickness. These findings allow of two general conclusions. First, absolute hardness assumptions on rhodium coatings are only permissible if the coating thickness is precisely known and is in correct ratio to the diamond hardness impression. Slight exceeding of these limits is sufficient to cause a sharp falling off in the hardness value found. The method can also be applied for direct measurement of the rhodium coating thickness, by producing hardness impressions with growing loadings until the apparent hardness-drop sets in.

Practical Aspects of Anodizing

O. Niedermeyer: *Metalloberflaeche*. Vol. 6, No. 2, B29.

The author discusses anodizing techniques from the light of his own practical experience. Details are given of the necessary pretreatment, including mechanical working, grinding and polishing, and cleaning of the parts.

Dealing with the anodizing process itself, the racks should grip well and should be sufficiently well dimensioned. Al-Mg-Si alloys have proved best for the rack material. There is considerable difference of opinion as to whether the racks should be coated with a protective lacquer or not. Longer rack life was not obtained with a durable lacquer. With a badly adherent or blistering lacquer, there is the great danger that hydrofluoric or nitric acid can be dragged into the anodizing bath from the polishing bath. Thorough rinsing should be given after every working stage, particularly after polishing, in running water (air agitation is also very advantageous). Operating personnel have to be closely watched to ensure that this thorough rinsing is done.

The most favorable anodizing temperature has been found to be 18°C. $\pm 2^\circ$. Too high a current density is avoided; about 1.2 amp./sq. dm. has

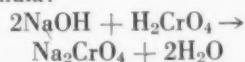
been found sufficient, as too rapid a formation of the coating acts adversely on the luster. This figure however, only applies to the ware. For the racks, particularly if lacquered, the figure must be higher. The density of the anodizing (Eloxal) bath is 20°Bé. Flowing water in sufficient amount should be available for rinsing. Air agitation should also be employed. The pH value of the rinse water should in no case exceed 5.8.

Whether the anodized coating should be sealed in distilled water or in nickel acetate is a matter of opinion. The author has found that the nickel acetate seal is superior to hot water. But, whichever method is used, a temperature of 92 to 95°C. should always be maintained. In the technical literature, temperatures of 80-85°C. are mentioned, but these are not regarded as sufficient. Half an hour for the sealing is not too long. It has been found in corrosion testing of anodized coatings that the decisive factor is not the thickness of the coating, but a satisfactory seal is absolutely decisive. Sealing for 15 minutes as given in the literature has not been found suitable for the corrosion tests. The nitric acid dip after sealing is not necessary if all the other operations have been done properly.

Treatment of Drag-Out on Chromium Plating Racks

Metallwarenindustrie und Galvanotechnik: Vol. 46, No. 12, p. 577.

In large scale plating practice it is common to employ the same racks through all the different stages of the treatment line, from loading, through the cleaning, copper, nickel, and chromium on nickel. However, although this is efficient practice from the handling aspect, it can introduce practical difficulties. The chromic acid adheres obstinately to the racks and is difficult to remove and, in the course of time, can cause contamination of the cleaning and nickel baths. It has been found that, in spite of the most intensive rinsing after the chromium plating stage, the cleaning baths will gradually become colored yellow, due to the formation of chromate, according to the formula:



The sodium chromate has an adverse effect on the throwing power and the cleaning action of the bath and will

finally lead to adhesion trouble. The chromate ions will also drag into other baths and cause plating disturbances. Thus, in a nickel bath with a chromic acid content of 0.1 g./l., plating is no longer possible; only hydrogen is generated. To avoid this drag-in of chromic acid on the plating racks, up to now they have been rinsed either in hydrochloric acid or sulfuric acid-iron sulfate solution, or were dechromed electrolytically in caustic soda (50 g./l. anodically at 4-6 volts). In spite of this, it has been found that the cleaning baths still become contaminated.

Tests were conducted in the laboratories of a German plating firm with the object of overcoming this. The chromic acid can only be precipitated with expensive barium and lead salts, so a process was tested to reduce the hexavalent chromic acid to trivalent chromium salts. A number of reducing agents were tested for the purpose, comprising sodium sulfite, sodium thiosulfate, stannous chloride, hydrazine sulfate, hydroxylamine hydrochloride and sodium sulfide. Further tests were also conducted, the object of which was to add wetting agents to the normal dechroming baths so as to increase the action and also to ensure a better run-off of the liquid from the racks. These last tests established that the acids and electrolyte comprising the drag-out from the dechroming baths could be considerably reduced.

From the general results obtained with the tests it is proposed as a working procedure that about 1-2 g./l. of sodium sulfide should be added to the bath in which the racks are dechromed. The sodium chromate which is formed by the anodic solution of the chromium is reduced by this and the drag-in of the chromium into other baths is prevented. It is an advantage, in addition, to add a wetting agent to the cleaning bath. This has the dual purpose of reducing the drag-out and producing a dense foam cover on top of the bath which prevents the formation of spray. If it is only desired to reduce the adherent chromic acid on the racks, and particularly at places where the lacquer coating has become damaged, then there can be used either dilute hydrochloric or sulfuric acid, or dilute hydrochloric acid with the addition of about 2 g./l. of sodium sulfite or 1 g./l. of hydrazine sulfate or hydrochloride. The addition of a wetting agent here is also an advantage.

Recent Developments

NEW METHODS, MATERIALS AND EQUIPMENT
FOR THE METAL FINISHING INDUSTRIES



Lead Anodes

Alpha Metals, Inc., Dept. MF, 56
Water St., Jersey City, N. J.



ALPHA'S NEW LEAD ANODE
WITH RIPPLE ROUND DESIGN

By adding a deep ripple to the conventional round lead alloy anode used for chromium plating, the surface area has been increased by 6.8% without the slightest increase in anode size or weight. With this new round shape, the Ripple Round anodes are claimed to present the highest active working surface possible to the plating solution.

These anodes provide ample cross section to handle extremely high current densities without overheating. Since they not only run cooler but are also more rigid, due to their construction, the problem of warpage is eliminated.

All anodes are supplied with a choice of 6 "Easy Grip" hooks, which makes handling safe and easy. Hooks are produced in different lengths and different conductor bar openings. Cast of high copper alloy, the hooks offer top current carrying capacity and conductivity (most hooks have 250 to 300 amps.). They're lead coated for protection and have special knife edges which assures a good bite and electrical control at the conductor bar. Hooks can be plastic coated for maximum protection.

64/Circle on Readers' Service Card

Cleaner and Deruster

The Mitchell-Bradford Chem. Co.,
Dept. MF, Wampus Lane, Milford,
Conn.

The above manufacturer has announced two new products for the metal finishing industry.

1. Alkaline De Ruster No. 2 is an alkaline salt mixture to be mixed with water and used non-electrolytically at 180°F. to boiling to remove rust quickly and economically. It will also remove many types of paints. Because the product is an alkaline mixture it will not cause hydrogen embrittlement, will not attack the basis metal, is non-toxic and, after removing rust, tends to prevent further rusting or oxidation of the base metal. It eliminates the use of dangerous acids, produces no harmful fumes, is economical and safe to use and is completely dependable. Descriptive literature is available upon request.

2. Emulsion Cleaner No. 26 is a new organic emulsion cleaner designed for easy removal of heavy oils, greases and soils. It can be cut with seven or more parts kerosene or safety solvent and used at room temperature. The emulsion can be used prior to an alkaline cleaner to cut cleaning time and increase the life of the alkali cleaner. It quickly removes grease and grime from metal which can then be rinsed thoroughly in water. It will remove buffing compounds, and is also ideal for cleaning heavy machinery, airplane bodies, truck bodies, floors, etc.

The product can also be used in cases where organic solvents are prohibited by using Emulsion Cleaner No. 26 out one part Emulsion Cleaner No. 26 with seven or more parts water.

65/Circle on Readers' Service Card

Zinc Bright Dip

Conversion Chemical Corp., Dept.
MF, Rockville, Conn.

A new one-dip process with an easily handled powder is claimed to produce clear bright surfaces on zinc plated work with no brighteners in the zinc bath. The new powder, Kenvert No.

16, offers extreme economies over previous methods, with savings up to 50% possible, according to the manufacturer. It is packaged in non-returnable drums of either fiber or steel with polyethylene envelope liners. The new process operates satisfactorily in the temperature range from 90 to 110 degrees with no ventilation required, and offers excellent corrosion protection and unusual resistance to staining and fingerprints.

66/Circle on Readers' Service Card

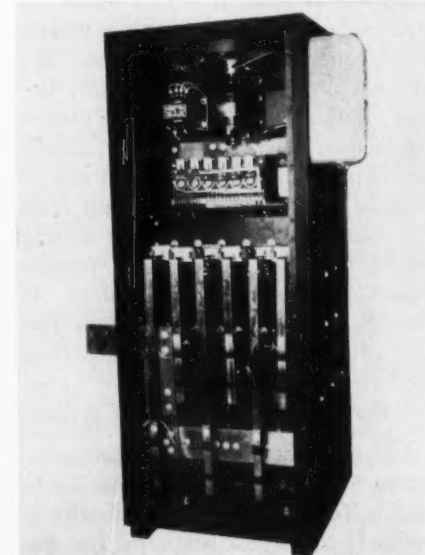
Germanium Rectifiers

Rapid Electric Co., Dept. MF, 2881
Middletown Road, Bronx 61, N. Y.

A new line of germanium rectifiers comprises models rated at 750, 1500, 2500, and 5,000 amperes at 2-12 volts, with input voltages at 220 and 440 volts.

Engineered with economy in mind, these units will sell at prices lower than similar rated selenium models. Model 1500 illustrated will sell for \$1,595. Called the Golden Line, these units ent germanium junctions. Instantaneous in action, unit shut-off is automatic and positive in the event of overload.

Its magnetic starter features overload protection against excessive power input. All models are fan cooled, with cabinet dimensions measuring 42"H x 22"W x 20"D, 60"H x 24"W



x 40"D and 60"H x 33"W x 26"D for 750, 1,500, 2,500 ampere models respectively.

67/Circle on Readers' Service Card

CORRECTION

In the article on barrel plating equipment on page 64 of the October issue, a statement is made that the automatic barrel illustrated in Fig. 13 will produce 1200 lbs. per hour. Mr. A. B. Hoefer of Frederic B. Stevens, Inc., manufacturers of this machine, advises that the load processed per hour would actually be 4,000 to 6,000 lbs.

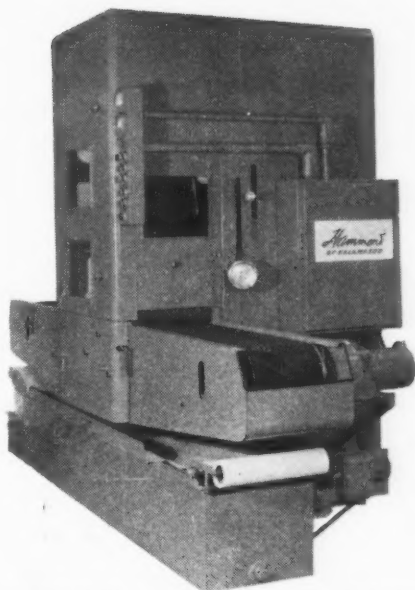
The Editor

Belt Polisher

Hammond Machinery Builders, Inc., Dept. MF, 1601 Douglas Ave., Kalamazoo, Mich.

The Model FF-12 Flat Finisher was designed for wet abrasive belt grinding, polishing and deburring of flat work such as sheets, strip, bars, stampings, plates, etc., up to 12" wide and 6" high.

Continuous feeding of work is ac-



complished through use of a variable speed air-tensioned endless conveyor, placing this machine in the "high production" class.

The head of the machine is of the two roll design, employing an abrasive belt 12" wide by 126" long. It consists of a large diameter air-tensioned track-

ing idler pulley, a heavy dovetail slide for work height adjustment and a contact roll driven by up to a 25 H.P. motor.

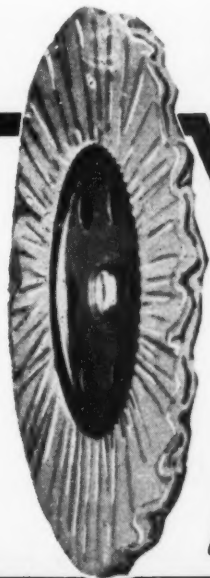
Other features and optional equipment include power elevation for head adjustment to the work 6 to 10" diameter contact rolls, adjustable work hold down rolls, magnetic conveyor platen, and automatic coolant filter.

68/Circle on Readers' Service Card

Liquid Detergent

Oakite Products, Inc., Dept. MF, 118 Rector St., New York 6, N. Y.

A new concentrated liquid detergent, called Oakite Liqui-Det, which contains no soap, is said to go into solution instantly and to develop copious suds, in hard or soft water, hot or cold, and then to penetrate and loosen the most common soils in a very short time. Furthermore, the company states, it can be used repeatedly without rinsing, and without causing any build-up of film or discoloration. It is safe on every type of surface and pleasant to the hands. As for economy, concentra-



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* ALL-PURPOSE BUFFING COMPOUNDS * WHITE COLORING COMPOUNDS * NICKEL BUFFING (LIME)
* EMERY CAKE * PLASTIC BUFFING COMPOUNDS * TALLOW GREASE STICK
* PUMICE GREASE STOCK * POLISHING WHEEL CEMENT * STEEL POLISHING COMPOUNDS

COMPOUNDS MADE IN BAR, SPRAY OR PASTE

69/Circle on Readers' Service Card

tions as low as 1/4 ounce to the gallon of water are being used with excellent results.

70/Circle on Readers' Service Card

Corrosion-Resistant Maintenance Coating

Metal & Thermit Corp., Dept. MF, Rahway, N. J.

A new vinyl maintenance coating, Uclon Coating 1400, is stated to provide the remarkable corrosion resistance of previous vinyl-based coatings, but eliminates strong odors and the need for meticulous surface preparation.

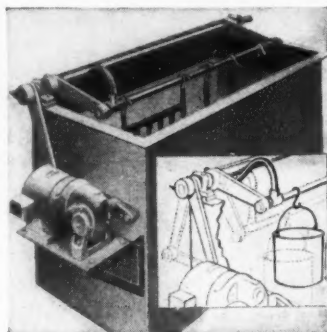
The coating resists acids, alkalis, water and other causes of early paint failure. It can be used for walls, floors, ceilings and the exteriors of equipment to resist corrosive fumes in chemical processing plants and other industrial atmospheres. The new coating is self-priming and brushes out like oil paint with no sagging or dripping. It can be applied over bare metal, wood, masonry and most previously painted surfaces without special surface preparation.

Its mild odor and high flash point (105°F.) permit application without interference with plant routines. Users may choose from six colors to combine good appearance with a durable protective coating.

71/Circle on Readers' Service Card

Metal Cleaning Slusher

Belke Manufacturing Co., Dept. MF, 946 Cicero Ave., Chicago 51, Ill.



Quick cleaning of metal parts without hand labor is afforded by an improved motor driven slusher. Material for cleaning is suspended in the cleaning or rinsing solution on a horizon-

tal rod which moves on an arc. The parts move up and down also sidewise through the solution producing a slushing action that washes away the dirt. The parts may be suspended on plating racks, in baskets or on wires. Electrical connection for electrical cleaning can be furnished.

The improved slusher is available complete with tank or can be furnished to fit present tanks. Drive motor is 1/4 H.P., available for single or three phase.

72/Circle on Readers' Service Card

Non-Sealing Aluminum Etchant

Wyandotte Chemicals Corp., J. B. Ford Div., Dept. MF, Wyandotte, Mich.

Mil-Etch is a caustic-type, non-dusty aluminum etchant which suspends dissolved aluminum in solution eliminating scale build-up that must be chipped off on walls of tanks (see photo). This new product will not develop scale throughout the entire use cycle. It produces a smooth, bright, satin finish surface and may be used for both regular deep etching of all standard aluminum alloys. The material devel-

Schaffner

BRAND
NEW
S-500

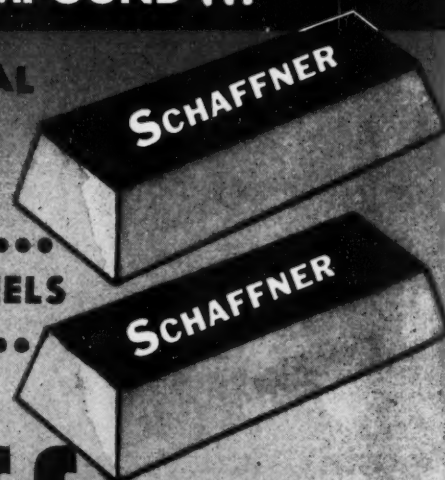
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(LIME) * EMERY CAKE * PLASTIC BUFFING COMPOUNDS * TALLOW GREASE STICK
* PUMICE GREASE STOCK * POLISHING WHEEL CEMENT * STEEL POLISHING COMPOUNDS

COMPOUNDS MADE IN BAR, SPRAY OR PASTE

73/Circle on Readers' Service Card



Before



After

ops a low level, never excessively high, foam blanket which effectively prevents fuming. Lightly soiled work may be etched without any pre-treatment; dirty work or work containing heavy oil or drawing compound should be pre-cleaned. Treated work may be anodized if desired.

The product is non-dusty, will not

cake in the drum, and has good tank life. It may be used until "loaded" with dissolved aluminum. A simple test kit is provided users for effective solution control.

The etchant is a free flowing granular product which is sold in full, open-head steel drums containing 425 lbs.

74/Circle on Readers' Service Card

Corrosion Resistant Pump

Vanton Pump & Equipment Corp.,
Dept. MF, 201 Sweetland Ave., Hill-
side, N. J.

A pump wherein fluids handled are in contact only with Teflon or Kel-F is designed for use with many extremely corrosive fluids, including those which could not be handled previously with other plastic or stainless steel materials of construction.

Since shaft seals and stuffing boxes are eliminated in the pump design, fluids or slurries are wholly isolated in a passage formed by the outer surface of the Kel-F liner and the inner surface of the Teflon or Kel-F body block. Operation of the pump is by means of an eccentric shaft and rotor assembly rotating within the liner and progressively pushing the fluid about its outer surface.

Teflon and Kel-F fluorocarbon materials have excellent resistance to temperatures up to 300°F. and corrosive fluids which include strong oxidizing acids, mineral acids, alkalis, aliphatic solvents and a number of chlorinated



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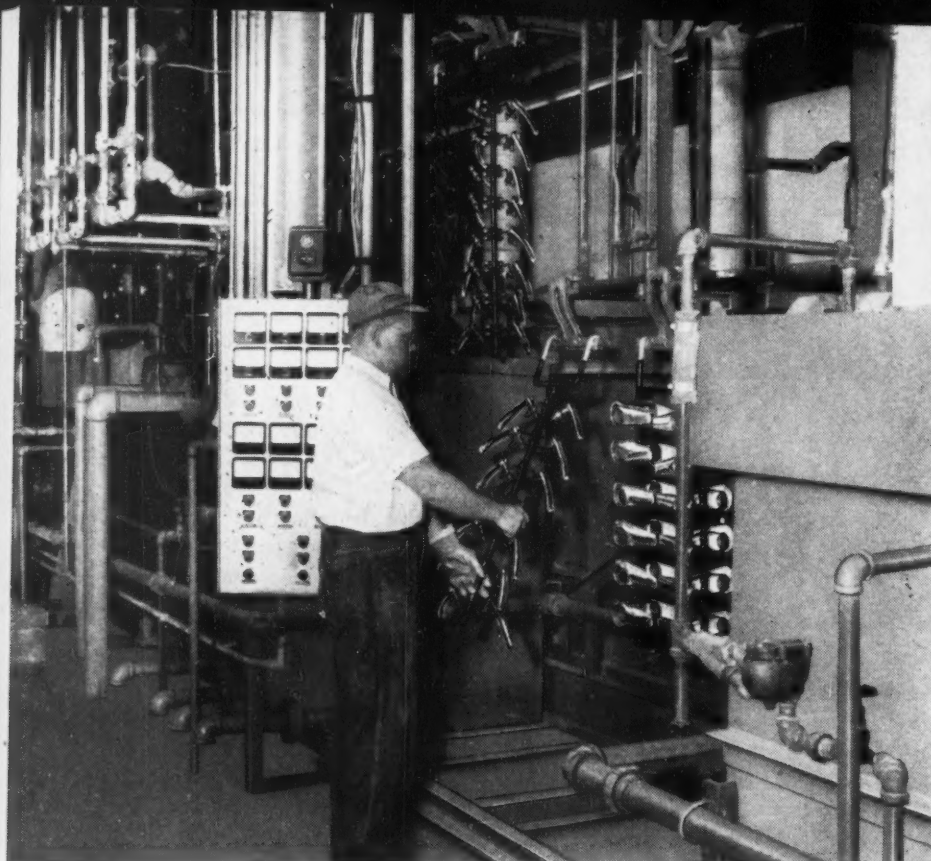
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* PUMICE GREASE STOCK * POLISHING WHEEL CEMENT * STEEL POLISHING COMPOUNDS

COMPOUNDS MADE IN BAR, SPRAY OR PASTE

75/Circle on Readers' Service Card



CUT YOUR PLATING TIME WITH THESE UDYLTE PROCESSES

HI-C Processes Give Faster Nickel Plate on Die Cast or Steel Parts

In plating some 5000 die cast and steel parts per hour, Rival Manufacturing Company of Kansas City, Missouri, use Udylite 514 HI-C and 31 HI-C bright nickel processes in combination with two Udylite Full Automatic Plating Machines.

The HI-C (high chloride) baths give faster bright nickel plate than any processes ever developed and at the same time brighter, more ductile and smoother nickel finishes. They are developments of the Udylite Research Corporation and are the only bright high chloride baths available commercially.

The HI-C processes plate nickel perfectly over copper for die cast parts and provide the important underlayer for the final chrome plated finish. They are also used by Rival as the basic coating on steel before the chrome is applied.

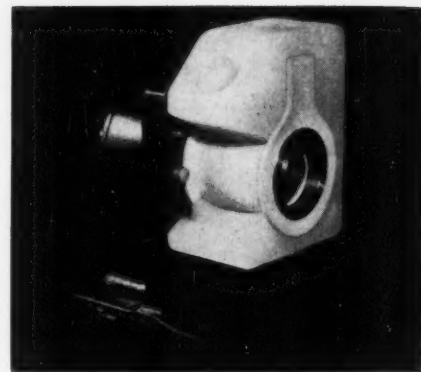
As every electroplater knows, where the cycles of copper, nickel and chrome plating are used, nickel plating is the most time consuming. Therefore, Udylite's development of HI-C for speeding up the nickel cycle is of prime importance.

The use of Udylite Full Automatics by Rival has greatly increased efficiency and economy. Only one man is required to inspect the parts and operate each machine. Now there is complete coordination between fabricating, finishing and assembly. HI-C processes and the controlled time cycle of plating have improved the quality of finish and greatly reduced rejects.

A Udylite HI-C nickel process and a Udylite Automatic Plating Machine will save time, money and improve your product. Let us tell you how. Write us today.

THE
Udylite
CORPORATION
DETROIT 11, MICHIGAN

**WORLD'S LARGEST
PLATING SUPPLIER**



solvents as well as various types of fuels, hydraulic fluids and red fuming nitric acid.

The pumps are available with constant or variable speed electric or air motor drives. Capacities are available to 5 g.p.m. with pressures to 50 p.s.i. Other plastic materials of construction are available in sizes to 20 g.p.m.

76/Circle on Readers' Service Card

Aluminum Etchant

*Hanson - Van Winkle - Munning Co.
Dept. MF, Matawan, N. J.*

New 85S aluminum cleaner was developed for use as a caustic etchant bath and, as such, is an efficient and effective means of cleaning and brightening aluminum surfaces. It contains an inhibitor which eliminates formation of scale on tank walls and coils, the above manufacturer reports. It also provides a built-in means of minimizing formation of sodium aluminate, an etching inhibitor at high concentrations, providing maximum utilization of the caustic soda.

Complete operating instructions and analytical processes are provided for the new etchant, to enable the user to maintain it at maximum efficiency. For example, the bath is initially made up with 8 oz./gal. of 85S etchant. As sodium aluminate builds up, the etchant concentration is increased so as always to exceed sodium aluminate content by 3 oz./gal. The latter will reach a maximum of about 15 oz./gal.

By maintaining this excess etchant content, the bath can be operated for long periods without dumping, since hydrous aluminum oxide will settle out in the form of sludge. Dumping is necessary only when sludge becomes excessive, and it can be flushed through standard sewage facilities or recovered, if desired.

77/Circle on Readers' Service Card

Corrosion-Resistant Relief and Back Pressure Valves

Milton Roy Co., Dept. MF, 1300 E. Mermaid Lane, Philadelphia 18, Pa.

A new line of relief valves and back pressure valves can be used with corrosive fluid at pressures to 1500 p.s.i. and temperatures to 250°F. The top works of these valves are protected by Kel-F thermoplastic diaphragms.

Available in standard 1/4, 1/2, 3/4 and 1-inch sizes, these valves offer a wide range of pressure settings which are easily made with a screw driver. For high corrosion resistance, valve bodies are constructed of cast steel, 316 stainless steel, Carpenter No. 20 and Hastelloy C.

78/ Circle on Readers' Service Card

Industrial Hand Cleaner

United Research & Development Associates, Inc., Dept. MF, 151 Oliver St., Newark, N. J.

"Lano-cel" hand cleaner is designed to remove industrial dirt by rinsing or wiping clean with or without water.

It is a non-abrasive cream containing lanolin with a new fungicide-bactericide and is available in 13 and 28 oz., as well as 6 and 25 lb. cans.

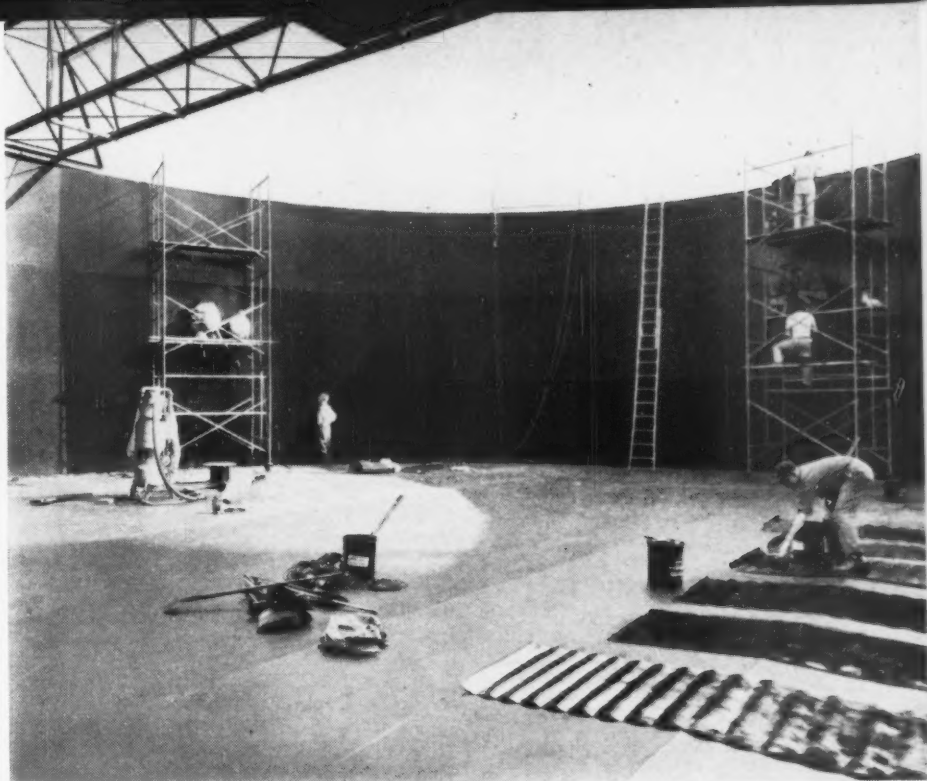
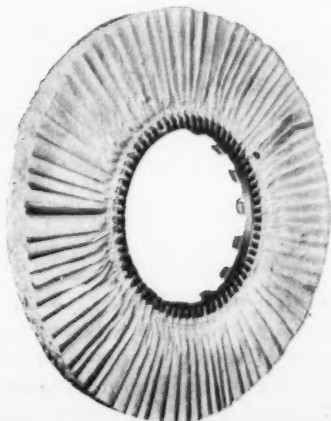
79/ Circle on Readers' Service Card

Pleated Cloth Buff

American Buff Co., Dept. MF, 2414 S. LaSalle St., Chicago 16, Ill.

A new flexible cloth buff is stated to replace full disc buffs for faster cutting and high, soft coloring. Pleating the bias-cut cotton has provided an extra strong, buff that wears longer than a full disc buff and remains soft and flexible.

The "centerless" construction feature of the new buff permits high running speeds without burning or discoloring



UDYLITE KOROSEAL* LINING

Answers The Waste Disposal Problem

Protection of the steel and concrete tanks from the corrosion of acids in waste disposal is a problem which must be answered with safety and permanence.

Koroseal* installed by Udylite is the answer because it is impervious to the attacks of acid and Udylite methods of application and welding techniques insure continuity of protection.

Here are tanks, eleven steel and four concrete, as large as the one pictured above—68 feet in diameter and 20 feet high. Udylite men of experience in Koroseal* lining work of all kinds are working to beat the weather man to complete this installation. Over 40,000 square feet of Koroseal* are being used to line these tanks.

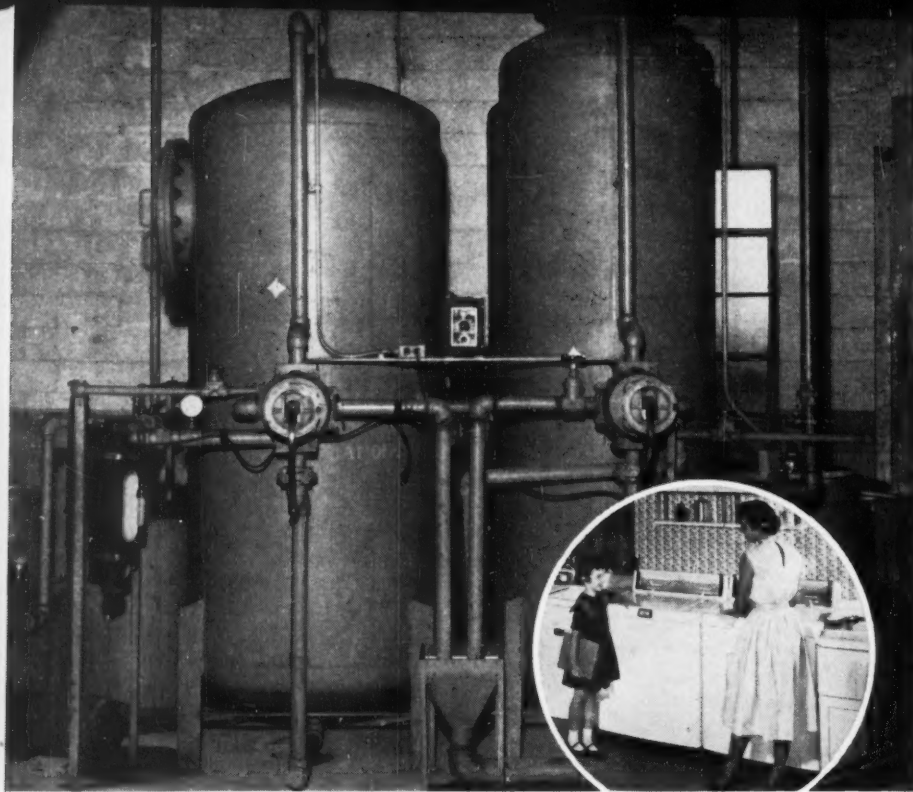
Almost fifteen years of experience stand Udylite in good stead in Koroseal* lining in the factory or out in the field. Udylite developed the patented welding torch which welds each seam of the lining and assures the finest and tightest tank linings available. Special cements and special methods of applying the cements have improved the quality of tank linings—experience gained by many years of lining tanks in volume.

For tank linings of any kind—regardless of size or location—it will pay you to consult Udylite. Write us today.

*Product of B. F. Goodrich Company

THE
Udylite
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DETROIT 11, MICHIGAN

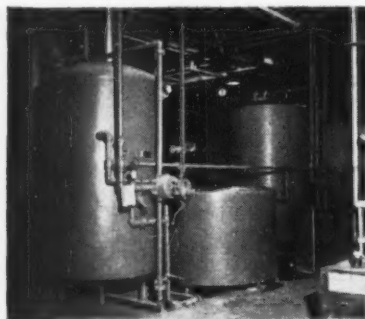
WORLD'S LARGEST
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Industrial Demineralizers help produce flawless finish for Whirlpool-Seeger

A good sales talk is backed by practical chemical engineering. The gleaming synthetic enamel and porcelain finishes on RCA WHIRLPOOL Washers and Dryers are sprayed and baked on metal parts that are prepared for finishing in chemical and steam baths and then rinsed in water. **Rinse water is a critical factor . . .** even the finest drinking water can leave salt spots that cause finishes to crack and chip. Whirlpool-Seeger engineers have a minimum of rinsing troubles. They use the Industrial Demineralizers pictured above to obtain rinse water as pure as commercially distilled water. Result: A beautiful, lasting finish coat with virtually no rejects due to salt spots.

The picture below shows another Industrial installation at Whirlpool-Seeger, a dual-softener for supplying soft water to the plant boilers. It cuts maintenance costs by preventing scale and thus gives a better heat transfer. The company has four Industrial installations, each designed to do a specific task . . . each has been a profitable investment.



Industrial matches equipment exactly to the job, treating every installation as a unique problem, with complete chemical analysis and survey of methods and materials. This objective engineering produces equipment that becomes a real asset to your company—a tool for quality-control and greater output. If you will outline how you use water in processing, we will be glad to make recommendations and estimates.

Write for Bulletin 201 and 211

SEE INDUSTRIAL FOR PROMPT SOLUTION TO WATER PROBLEMS

TRIFUGAL PUMPS

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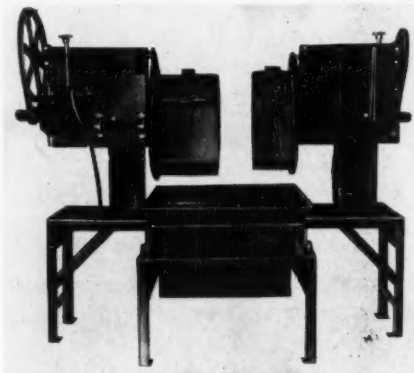
5906 OGDEN AVENUE • CHICAGO 50, ILLINOIS

the work. Instead of being fastened to a solid center, the buff units are securely held in place by a special gripping steel ring, leaving space around the shaft through which cool air circulates in all directions.

80/Circle on Readers' Service Card

Tumbling Barrel Stand

Rampe Manufacturing Co., Dept. MF, 14915 Woodworth Ave., Cleveland 10, O.



The Piggy Back Stand is designed with two legs to bolt to the frame of the screen separator. It supports a tumbling unit in position to unload into the separator. The stand can be used either left or right hand or two stands can be used to position two tumblers to unload into the same separator. Stands are of all steel construction for heavy use.

81/Circle on Readers' Service Card

Ultrasonic Transducers for Cleaning and Processing

Gulton Industries, Inc., Dept. MF, Metuchen, N. J.



A new series of ultrasonic transducers for a variety of moderate scale ultrasonic cleaning and processing applications has been designed for use with ordinary organic solvents, aqueous solutions, mild acids, alkalis and normal detergents. The units, designated Glennite Series UT-10, have a

rated power of 250 watts and maximum operating temperature of 155°F. A standard coaxial connector is provided for V.F. input and the transducers are cooled by forced air. The transducers are available in 1/2 and 1 quart sizes with operating frequencies of 22 or 55 kc.

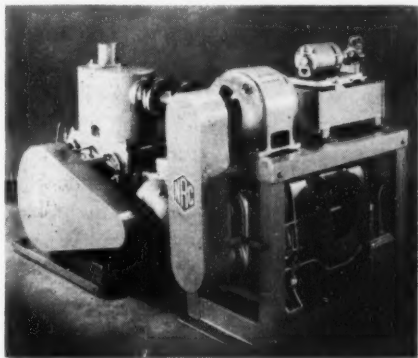
82/Circle on Readers' Service Card

High Capacity Vacuum Pumps

NRC Equipment Corp., Dept. MF, 160 Charlemont St., Newton Highlands 61, Mass.

The Series 4700 mechanical booster vacuum pumps can reduce impressively the time required for many industrial high vacuum processes, according to the above manufacturer. Available in six sizes from 1,000 to 12,000 CFM, these new pumps operate at top capacity throughout the broad pressure range of 5 to 2,200 microns.

In addition to their ability to pump at peak capacity throughout the important 5 to 2,200 micron range, the Series 4700 have the advantage that



they use no oil either as a pumping medium or as a sealant in the high vacuum system.

83/Circle on Readers' Service Card

Pressure-Cooled Buffs

United Buff Products Corp., Dept. MF, 231 Oak St., Passaic, N. J.

New Type "K" and Type "Q" pressure-cooled buffs are two of the latest developments in the field of buffing. They have been developed, tested and perfected especially for finishing of die castings or permanent mold castings.

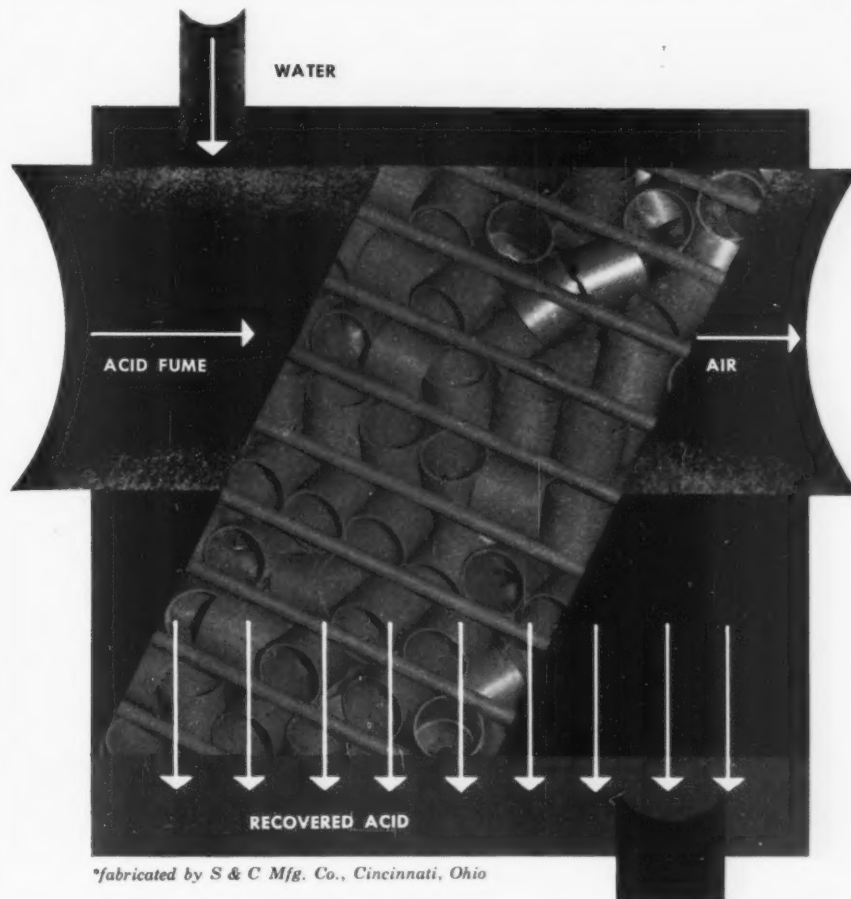
The action of these buffs is such that they tend to remove excessive buffing compound residues from parts being buffed, leaving a cleaner finish preparatory to the plating cycle, it is claimed.

The buffs are also exceptionally low in cost, generally ranging from 20% to 50% below the cost of usual venti-

12,000 cfm pvc scrubber* cuts weight 83% . . . cuts costs 33%

NOW 12,000 CFM air and acid fume scrubbers are being completely constructed of Vyflex F-92 rigid PVC . . . even to the nuts, bolts, and rings. Only the sump is metal, and even it is lined with Vyflex FLIGID PVC lining.

Little more than a sixth the weight of conventional designs, and costing considerably less, the new PVC scrubbers equal or better them in terms of performance. In chromic acid service, for example, their efficiency is such that 95% recovery of the acid can be affected.



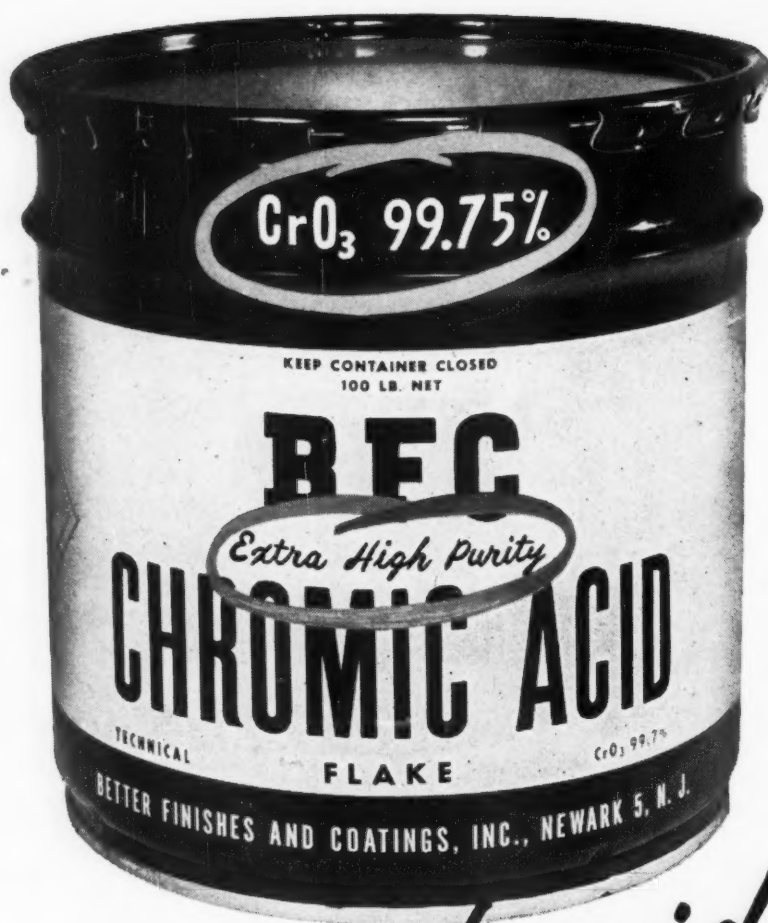
Often used for hoods, ducts, etc., in corrosive service, Vyflex F-92 is an excellent choice for these scrubbers. Inert to the widest range of corrosive fume, splash, and liquid at temperatures to 165°F, this unplasticized Polyvinyl Chloride offers such attractive physicals as high tensile and flexural strength, hardness, abrasion resistance, and electrical and thermal insulation properties. High strength-to-weight ratio even permits such large structures as these scrubbers to be suspended easily from plant ceilings.

Well equipped, highly experienced Kaykor fabricators across the country stand ready to solve your corrosion problems with standard or custom designed equipment and parts of Vyflex F-92 PVC.

GET THE FACTS! Write for complete information in new Bulletin "F-92", Available free on request to Kaykor Industries, Inc., 4403 Broad Street, Yardville, New Jersey, or ask your local Kaykor fabricator.



KAYKOR INDUSTRIES INC.
Division of Kaye-Tex Manufacturing Corp.
YARDVILLE, NEW JERSEY



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Why not send us an order to cover your next spot need?



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lated buffs. Samples are available and orders are being shipped regularly.

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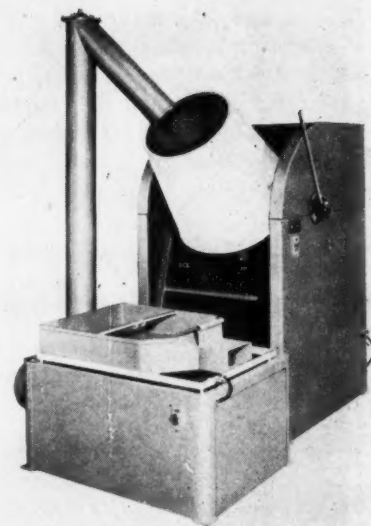
Hot Sawdust Equipment

Speed-D-Burr Corp., Dept. MF, 3613 San Fernando Road, Glendale 4, Calif.

Hot sawdust drying and polishing units and accessory equipment, newest of the above manufacturer's growing precision barrel finishing equipment line, is now available for industrial applications in plants of any size.

Available in three models (deluxe, standard and economy), there are units to fit the specific requirements of a particular plant need. Each of the units may be ordered separately as

a barrel unit only, as a barrel unit with deluxe elevator refill (photo) or as a barrel unit with standard mechanical separator. Cabinet construction on the deluxe model is of heavy gauge tailored steel, aircraft truss design, enclosed and streamlined and finished in Vista Green. The standard models are the same as the deluxe line except that the cabinet is semi-streamlined. For the economy line, an open heavy angle-iron design of heavy gauge steel finished in Vista Green. The barrel is the same for all models and is a heat jacketed, all welded construction of heavy gauge tailored steel, 24" x 24" — 5 cu. ft. capacity, finished in Safety Yellow. These units utilize power of a 1/4 HP, 110 volt, single



phase gear motor with switch and gas venturi, though on special order extra HP and/or 3 phase, 220/440 motors are available at slight extra cost.

The Deluxe Elevator Refill may be used with all three models or purchased as a separate accessory as desired. This unit comes complete with top parts pan (1 screen furnished — of a desired screen size), a pneumatic vibrator separator, bottom storage pan and screw elevator for automatic barrel filling, with a 1/2 HP, 110 volt single phase motor and switch. The Standard Mechanical Separator may also be purchased as a separate unit or may be used in conjunction with the three models. This unit comes complete with top parts pan (1 screen furnished — of a desired screen size), pneumatic vibrator separator and bottom sawdust storage bin. A complete line of door accessories is also available as are the bound screens (no sharp edges) — available in screen sizes of 1/32" steps from 1/32" through 2".

Completing the hot sawdust line of equipment is the Mity-Mite hot sawdust unit that comes complete with top ing pan for separation with an enclosed parts pan, bottom storage and hand- and streamlined cabinet of heavy gauge tailored steel in aircraft truss design and finished in Vista Green. The barrel is heat jacketed — all welded construction of heavy gauge tailored steel with a 1.2 cu. ft. capacity, finished in Safety Yellow.

87/Circle on Readers' Service Card

Portable pH Recorder

The Bristol Company, Dept. MF, Waterbury 20, Conn.

Portable, self-contained, pH measuring and recording instruments requir-

ing no external power supply are now available for field surveys of stream pollution, waste-treatment plant effluent, and industrial water supplies, as well as in-plant studies at locations where a permanently mounted pH recorder is not desired for any reason, or where power is not available.

The new device consists of two units: a Model 524 pH recorder and a Beckman N-2 amplifier. This equipment will cover the total pH range of 0-14 in two partial ranges of 0-8 and 6-14. Selection is by means of a switch located on the amplifier. The recorder uses carbon-coated 8-inch diameter charts, and makes a record with a vibrating-type stylus. The chart drive can be set to rotate the chart in either 1 hour or 24 hours, depending on the application.

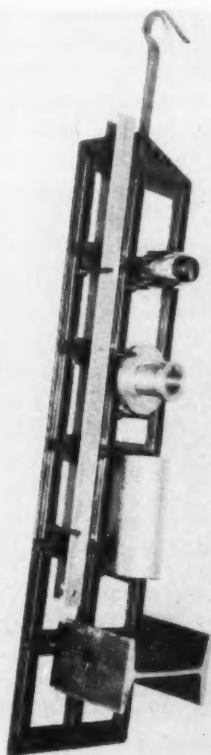
The two units together weigh less than 50 pounds, and are compactly arranged for easy transport from one location to another. Temperature compensation is by means of a manual adjustment, after reading the temperature of the liquid being tested. Various types of electrodes are available.

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Anodizing Rack

Robé, Inc., Dept. MF, Box 8605
Washington 11, D. C.

A truly versatile anodizing rack is now available, that can actually reduce



This man is helping
cut small parts drying time
just about one-half...

Model 20 New Holland KREIDER Centrifugal Dryer

*AIR-DRIES...as it
SPIN-DRIES!*



Now you can *spin-dry* small parts in continuous *fresh air* in as little as 15 seconds... cut drying time just about one-half.

Double-action drying gives you smooth moisture-free surfaces... reduces your finishing problems by eliminating the scarring and marring frequently responsible for costly "rejects."

Speed production... cut costs way down with New Holland's easy-to-run Model 20 Kreider Centrifugal Dryer.

Choose from 3 models engineered to meet your requirements: — Standard Model; Standard Model with Supplementary Electric Heat; Standard Model with Supplementary Steam Heat.

— SPECIFICATIONS: —

1 h.p. motor—220, 440, 550 volts—2- or 3-phase—spins 75 lb. loads at 825 r.p.m. ...	steel mesh basket ...
Quiet V-belt drive ...	Weight: 490 lbs. ...
30-blade suction turbine draws air through spinner ...	Floor space: Just under 5 sq. ft. ...
Arc-welded steel-plate construction ...	Meets N.F.C. Specs.
Heavy-gauge woven	Optional: J.I.C. Control: Mounted on right, left side or wall.
	160° supplementary heat: 2350-watt Chromalox, or steam.

Send for illustrated 4-page folder.
Address Dept. MF-126
New Holland Machine Company
New Holland, Pa.



New Holland Machine Company

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rack costs. The rack is fabricated entirely out of titanium, and is designed to permit easy and rapid adjustment of contact pin spacing, while assuring effective electrical contact where it is needed.

The titanium VAR is resistant to all of the chemical solutions that are encountered in the anodizing process, and forms a light non-insulative coating which does not have to be stripped after each cycle.

Additional benefits are:

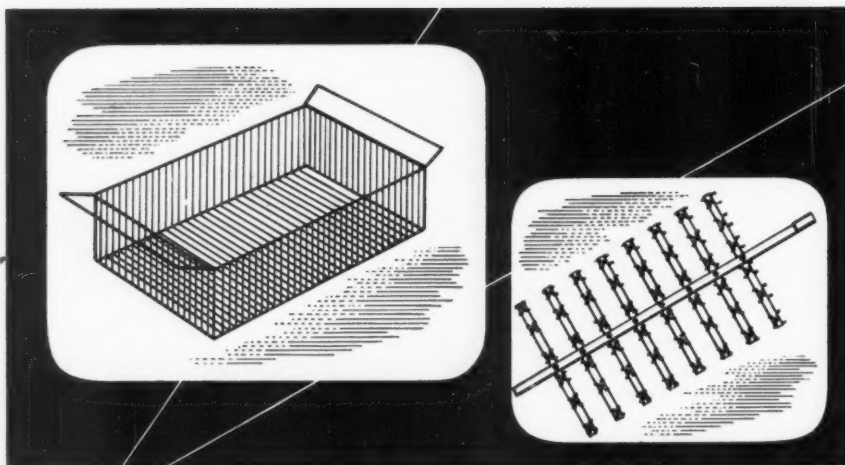
- Long service life, as much as 100 times greater than aluminum and magnesium anodizing racks,
- Easily accommodates work hav-

- ing a wide variety of sizes and shapes,
 - Rack coatings are not needed,
 - No stockpiling of useless racks,
 - No special rack design costs,
 - Very low amperage requirements.
- 90/Circle on Readers' Service Card

Large Capacity Spray Nozzle

Spraying Systems Co., Dept. MF,
3201 Randolph St., Bellwood, Ill.

A new, large capacity flat spray nozzle, identified as the 2-U-Veejet, is the largest of its type ever produced by the company. Capacity of this new type nozzle ranges from 73 gpm at 15 psi to 330 gpm at 300 psi. It is supplied in choice of two types of spray angles. The nozzle is designed free of



METAL SURFACES LAST LONGER with a COATING OF STANLEY CUSTOM PLASTISOL

Plating racks, appliances, and most metal surfaces that need protection are safer under one of Stanley's complete line of plastisols. High resistance to chemicals, corrosion, and hard use plus a tough, attractive surface that looks like baked enamel but lasts longer are two reasons why Stanley Plastisols over Stanley Primers are turning up on more metal products every day. Write for more information and ask about Stanley Stop-Off Coatings for

platers. Address Stanley Chemical Company, 81 Berlin St., East Berlin, Conn. Midwest representatives: Howell Industrial Plastics, Grand Rapids, Michigan.

Ask for FREE Bulletins on Stanley plating rack coatings.



STANLEY CHEMICAL

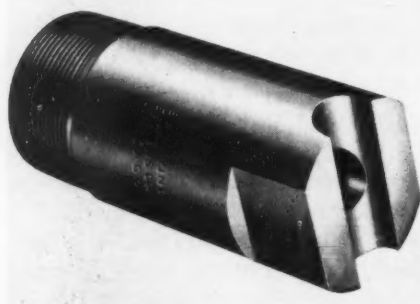
LACQUERS
SYNTHETICS
VINYL
ENAMELS

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cores, vanes or obstructions of any kind and is made with a 2" male pipe connection. Designed for heavy duty cooling and washing operations, the nozzle is also suitable for other applications where a large capacity flat spray is desired. It is made standard in brass

and can be supplied in other materials upon order.

92/Circle on Readers' Service Card



Gumm Chemical Appoints Applegate

The Frederick Gumm Chemical Co., manufacturers of Clepo products, announces the appointment of C. Foster Applegate as distributor representative in the East Central New York State area. Mr. Applegate is a grad-



C. Foster Applegate

uate of Colgate University and has previously been associated with the Hudson Motor Co., Columbian Rope Co., and the Holcomb Steel Division of Crucible Steel.

Mr. Applegate's address is 101 Revere Road, East Syracuse, N. Y. Phone East Syracuse 725797.

Free Course in Electroplating

The course of study in electroplating given at the Fort Greene Evening High School, 29 Fort Greene Place, Brooklyn, N. Y., (formerly Brooklyn Evening Technical High School) will begin its spring term on February 4, 1957.

The session is divided into classroom discussion and laboratory experiments. The classroom topics will include simple calculations, reading graphs, chemistry of the plating tank, pH, wetting agents, pitting, deionizing. The laboratory experiments will include solution analysis, Hull cell studies, anodizing.

Registration begins January 28, 1957, and daily thereafter from 7:00 to 9:00 P.M. Classes will meet on Mondays and Wednesdays from 6:45 to 8:15 P.M. including about six (6) Fridays. The term begins February 4 and ends June 27, 1957. Register with Mr. J. Serota in Room BW17 or 3E10.

Changes in Management Announced by American Buff

Ben P. Sax, founder of American Buff Co., Chicago, has moved from president to board chairman of the firm.

A new management lineup for the company includes Leonard B. Sax

BUSINESS ITEMS

as president; *Stanley P. Sax*, of Detroit, executive vice-president in charge of sales; *Nathan E. Sax*, vice-president; and *Harold N. Sax*, secretary.

Iritox Chemical Expands

Iritox Chemical Co. announces the expansion of the firm's activities. On Nov. 5, they moved to larger quarters at 229 Fourth Ave., N.Y.C. Phone: AL. 4-9574.

Coincidental with the move *Miss Florence S. Okwit*, with the company for several years, moves up to manager of the non-ferrous metal purchasing department. *Joseph Sweeney*, formerly with International Nickel Co., has been named executive in charge of operations at the Lebanon, Penn. plant, where the firm processes non-ferrous metals and alloys.

H-VW-M Names Bagwell Chief Engineer

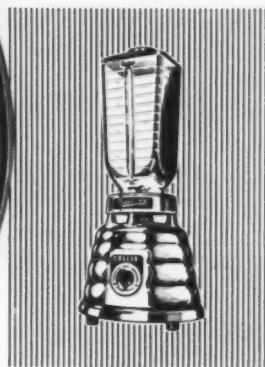
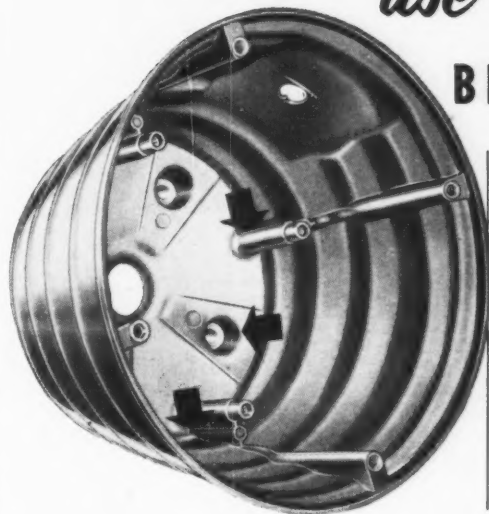
Charles E. Bagwell has been named chief engineer at *Hanson-Van Winkle-Munning Co.*, according to an announcement from the company. In this capacity he will be in charge of all equipment design and engineering for the company's extensive line of automatic metal finishing machinery and processes.

Mr. Bagwell's experience and training in electronic controls and engineering design will be applied to extending new principles of automation and control to metal finishing problems. He will be chiefly concerned with advance design concepts for automatic controls for aircraft and missiles. During this period he also worked with



Charles E. Bagwell

for greater throwing power use SEYMOUR BRIGHT NICKEL



Plating deep recesses and depressions in the die cast bases of world-famed OSTERIZER Blenders is quick and easy with Seymour Bright Nickel.

Greater throwing power, high ductility and easy control are features which distinguish Seymour Bright Nickel Solutions. Because

they also eliminate buffing and polishing before chrome plating and are shipped in throwaway containers, they're tops with electroplaters everywhere.

Let Seymour help solve your plating problems in its Experimental Plating Laboratory. Write for details without obligation.

SEYMOUR

THE SEYMOUR MANUFACTURING CO.
4 FRANKLIN STREET, SEYMOUR, CONNECTICUT

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airborne fire control systems and radar controls.

Mr. Bagwell was vice-president of a consulting engineering firm from 1954 to 1956. He was concerned at this time with control systems, computers and the application of specialized controls to commercial machinery.

He is a graduate of the U. S. Naval Academy (1943) and served in the European and Pacific theaters until 1946. Before attending Annapolis he studied chemical engineering at Georgia Tech. He also took graduate engineering courses at the University of Pittsburgh (1947-50), where he specialized in servomechanism theory, physics and the study of electronic controls.

Industry Receives Additional Nickel

Arthur S. Flemming, Director of Defense Mobilization, announced on Oct. 17, that he has authorized an additional diversion to industry of 5 million pounds of nickel scheduled for shipment to the Government during the fourth quarter of 1956.

This latest action will bring total diversions for the fourth quarter to 25 million pounds and for the entire year to 79.3 million pounds.

At the same time Mr. Flemming also authorized the diversion to industry of all nickel scheduled for shipment both to the national stockpile and to the Defense Production Act inventory

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PURE OR CONTAMINATED NICKEL
FOR DIRECT MILL SHIPMENT**

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\$ SALE \$

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INCONEL
MONEL
18-89 and 35-15
STAINLESS STEEL
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Other Divisions: Wolverine Steel Sales Co., Korman Barrel and Bag Co.

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J. Douglas Patrick

product development engineer. He will devote full time to product testing and development in the field, concentrating in the New England area. He brings to the company 16 years of metal cleaning, plating and finishing experience.

Mr. Patrick has been active in all phases of metal finishing as foreman, superintendent of plating and process engineer, having been until recently with the Electrochemical Section of General Motors' Frigidaire Division. He is an active member of the American Electroplaters' Society and The Electrochemical Society.

Sel-Rex Precious Metals Expands Product Line, Changes Corporate Name

Sel-Rex Precious Metals, Inc., has expanded its product line to include electroplating processes and chemicals, other than precious metals, as well as electroplating equipment of their own design and manufacture, according to an announcement received recently.

The corporate name has been changed to *Sel-Rex Corporation*, with executive offices at 155 Manchester Place, Newark 4, N. J., in order to avoid the misleading impression that the firm deals exclusively in precious metals.

Officers of the new corporation are: *M. M. Messing*, president; *E. C. Rinker*, vice-president-general manager; *L. R. Collart*, vice-president-treasurer; and *F. W. Brearley*, assistant secretary.

Dr. Robert J. Rohr Joins Magnus

Dr. Robert J. Rohr, has joined the *Magnus Chemical Co., Inc.* of Gar-

in the first quarter of 1957. This is the first time since the Korean situation, he pointed out, that the government will not be in the market for nickel.

Diversions for the subsequent quarters of 1957, he said, will be considered at a later date.

Mr. Flemming's decision followed consultation with the Defense Mobilization Board.

Armour Holds Training Session

Sales representatives from *Abrasive Specialists* of Milwaukee, Wis. and from *Bomhard Supply*, Steubenville, Ohio, recently completed a one-day

training session at the *Coated Abrasives Division, Armour & Co.*, Alliance, Ohio.

D. L. Mulgrew and *C. Hinkle* represented *Bomhard Supply* while *E. Boeck*, *H. Kever*, and *P. De Veau* represented *Abrasive Specialists* of Wisconsin. The training session included technical training in the application of coated abrasives as well as a plant tour.

MacDermid Appoints Patrick

To expand new product service facilities, *MacDermid, Inc.*, Waterbury, Conn., has announced the appointment of *J. Douglas Patrick* to the post of



Dr. Robert J. Rohr

wood, N. J. as Midwest regional sales manager, responsible for the administration of sales and service activities in the midwestern area.

Dr. Rohr holds an undergraduate degree in mechanical engineering from Georgia University and a Master's and Ph.D. in chemistry from the same university. He has spent many years in the sales and service of metal-treating chemicals and equipment in this country and Europe. He is a member of the A.E.S. and A.S.M.E.

Thrice wounded in World War II, he holds the coveted Silver Star citation and is now active in the Air Force Reserve. With his wife and three children, Dr. Rohr resides in Lake Villa, Ill.

Seymour Mfg. Appoints Castellano

The Seymour Mfg. Co., Seymour, Conn., has named Eugene N. Castellano manager of the company's bright nickel department. Mr. Castellano's extensive background in chemistry includes four years of research and production chemistry in the electroplating field.

Prior to his present affiliation, he was with Bart Laboratories. He holds a B.S. degree in chemistry from Seton Hall University, and is an active member of the American Electroplaters' Society.

Earley Appointed Sales Manager of Sulphur Products Co., Inc.

Due to the recent death of Wilfred S. McKeon, founder, Sulphur Products Co. announces the appointment of M. F. Earley as sales manager.

Mr. Earley, a resident of Meyersdale, Pa., will handle national sales from



HAMMOND MODEL VRRO
Two-Spindle Variable Speed Lathe

STEP UP PRODUCTION—REDUCE FINISHING COSTS with Hammond DOUBLE SPINDLE LATHES

ALSO AVAILABLE IN WIDE SWING MODEL VRROW

Wide swing construction, with extended bearing housings and spindles, provides additional working space for large, bulky pieces.

- No "down time" for one operator when the other changes wheel — each operator has his own motor, control and variable speed drive.
- Convenient Variable Speed dial is within arm's reach of the operator — no "climbing" around in back to change speeds.
- Wheel economy and better finish. As wheel wears each operator can increase speed — to maintain constant peripheral speed for uniform and better finish, maximum production and wheel life.
- Available in 3 sizes — two 5 HP, two 7½ HP or two 10 HP.

Cost reduction is the need of the day —
Write for catalog.



Hammond Machinery Builders

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his office at 621 West Pittsburgh St. in Greensburg, Pa.

Ross to Handle Quelcor Products

Ross Equipment Co., Denver, Colo., has been appointed to handle the sales and servicing of Quelcor Inc., plastisol products in Colorado, southern Wyoming, eastern Utah and northern New Mexico. President of Ross Equipment is Ross Recktenwall, Jr.

Nankervis Occupies New Plant

George L. Nankervis Co. announces the completion and occupancy of its new multi-million dollar facility designed to accommodate its own manu-

facturing operations and those of its recently acquired subsidiary, the Commercial Research Division. Located on a 5 acre site in Northwest Detroit, the new plant comprises approximately 90,000 square feet. Large areas of glass and brick and one story construction give the plant a modern "ranch type" appearance. Off-street parking is provided for 300 cars. Besides being located advantageously to several arterial highways, the site is served by a double spur of the Chesapeake and Ohio Railway.

All manufacturing activities, such as sheet metal fabrication, metal finishing, electrical, mechanical, testing and calibration, flowmeter assembly, etc., are



grouped around a general assembly area allowing a natural flow of work throughout the plant. Five traveling bridge cranes cover the manufacturing area enabling motors, transmissions, large assemblies, etc., to be handled with ease.

Three fully equipped laboratories are provided for electronics, instrument research and development, and electro-

chemical analysis. Executive, staff and engineering offices are located around a general office area where the file records are kept. An attractively decorated coffee-kitchen-lunchroom is provided for employee use. Programmed-music is heard throughout the plant.

The new plant is located at 15300 Fullerton, Detroit 27, Mich.

Federated Metals of Canada, Ltd., Opens New Montreal Plant

Federated Metals of Canada, Ltd., has opened the second of its two new Canadian non-ferrous metal fabrication, processing, and refining plants. Official opening ceremonies were held on November 2nd at the new Montreal facility. The plant is located on a 9-acre tract in the suburb of Lachine, and consists of some 40,000 sq. ft. of

floor space. The company recently opened another plant in Toronto, located on an 18-acre tract in the township of Scarborough.

These new plants produce and distribute such specialized products as solder, grid metals, antimonial leads, type metals, babbitt metals and zinc die casting alloys. In addition, the new Montreal plant also fabricates lead sheets, pipes, traps, and bends, and operates a lead construction depart-

ment for Canadian industry. Further, the new plants also handle and process practically every type of non-ferrous scrap available in Canada.

Stevens Appointed Sel-Rex Precious Metals Representative

The appointment of *Peter Stevens* as sales engineer for the Midwest area, has been announced by *Sel-Rex Precious Metals, Inc.*, Belleville, N. J.

Stevens brings a background of 15 years' diversified experience in the metal finishing industry to his new position. Well qualified to assist accounts in his assigned territory from a technical as well as a sales point of view, his experience includes plant layout, cost analysis and trouble-shooting.

A chemical engineering graduate of Cooper Institute of Technology, Stevens served as plating consultant and technical service man on the industrial applications of the firm's products for three years immediately prior to his current assignment.

Stevens' temporary headquarters will be located in Chicago, although he will report to the Detroit office, located at 18040 James Couzens Highway, under the jurisdiction of *S. S. Wilson*, vice-president in charge of Midwest operations.

Cole Named Production Head

Jack Cole has been appointed head of production for Regco, a division of *Crown Chemical and Engineering*, Culver City, Calif., manufacturers of DC power supplies.

Mr. Cole formerly was with National Supply of Torrance, Calif., in charge of instrumentation development. He previously was with Douglas Aircraft, El Segundo, Calif., in the electrical maintenance department in charge of instrumentation and ground power supplies.

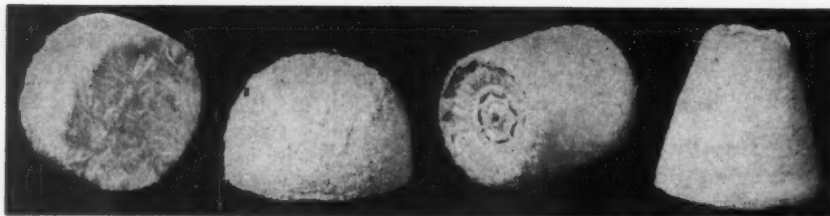
The new production head will be responsible for the expanded manufacturing program of the company, which has recently added a line of electroplating power supplies.

The company, formerly Regulator Engineering and Development Co., was purchased recently by Crown Chemical and Engineering.

Baker Succeeds Embshoff at Infileo

Retirement of *A. C. Embshoff* from active management of the Industrial

BUFFS FOR INSIDE POLISHING



GOBLET BUFFS, TAPER BUFFS, CYLINDER BUFFS, SMALL POLISHING WHEELS, RAZOR EDGE BUFFS, and many others for deburring, polishing and grinding any internal contour.

Write for additional information or contact your local dealer. These buffs are stocked by many dealers throughout the country.

We manufacture a COMPLETE LINE OF BUFFS including full disc loose and sewed buffs and polishing wheels. Our metal center BIAS TYPE BUFF may help cut your polishing costs.

Your request on your letterhead will bring our complete catalog by return mail.

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1660 Summerfield Street

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Canadian Distributor — LEA PRODUCTS COMPANY, Montreal

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A. C. Embshoff

Division of *Infilco Inc.*, manufacturers of water and waste treatment equipment with headquarters in Tucson, Ariz., was announced recently.

Mr. Embshoff specialized in hydraulic design, flotation research and boiler feedwater engineering before he joined the company thirty-five years ago. His wide experience in water treatment problems of the petroleum, pulp and paper and other industries will still be available to the company as a general consultant to the Sales Division, a position he accepted on his retirement on September 1st.

O. E. Baker succeeds Mr. Embshoff as manager of the division. Orlen Baker has been a member of the industrial division of the company for



O. E. Baker

three years. He, like Mr. Embshoff, received his degree in chemical engineering from Purdue University.

Lowe to Head Up Cowles Michigan Sales

Clyde E. Lowe is now Detroit district manager for *Cowles Chemical Co.*, Cleveland, Ohio.

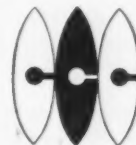
Lowe will be in charge of the sale and servicing of the firm's cleaners, phosphate metal coatings, and related metal finishing chemicals. He will work with Eaton Chemical and Dyestuff Corp., distributors of Cowles' metal finishing chemicals in Michigan and Northeastern Ohio. Lowe's home and headquarters will be moved to Detroit as soon as feasible. Meanwhile he will



ONE POWDER!

New Powder Gives One-Dip Brightening

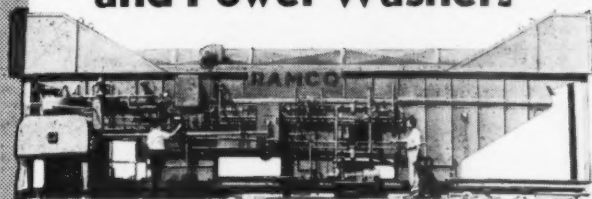
Mirror-bright, iridescent-free surfaces on zinc plate can now be obtained *with NO BRIGHTENERS in the zinc bath!* This revolutionary process requires just *one* easily handled powder, KENVERT No. 16. It is packaged in disposable drums with polyethylene liners, and offers savings up to 50% over previous methods. The new process operates satisfactorily in the temperature range from 90 to 110°F. with no ventilation required, and offers excellent corrosion protection and unusual resistance to staining and fingerprints. Other powders are available for economically brightening and passivating work from bright plating baths.



CONVERSION CHEMICAL CORPORATION

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RAMCO degreasers and Power Washers



Courtesy Ford Motor Car Co., Detroit

Call our Engineering Department for the latest in:
ULTRASONIC CLEANING MACHINERY
Complete line of washers, tanks, ovens, and allied process equipment.

RAMCO EQUIPMENT CORP. Div. of Randall Mfg. Co., Inc.
807 Edgewater Rd., New York 59, N. Y. • DAyton 3-3900

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Clyde E. Lowe

commute week ends from his home in Bay Village, Ohio, near Cleveland.

Lowe is married, one child, and a veteran of more than 16 years with the company's Metal Cleaner Department. During most of that time he has worked out of the main office in Cleveland. He has also represented the firm in Pittsburgh and in Chicago.

That portion of Lowe's territory that

was located in Cleveland and Central Ohio will be absorbed into the territory now being covered by *Elmer A. Lord*, who will continue to make his headquarters in Cleveland.

Thermal Appoints Page

Thermal Research and Engineering Corp. of Conshohocken Pa., announces the appointment of *Wm. Page* as district sales engineer in the Cleveland office located at 2000 Warrensville Center Road, Cleveland 21, Ohio. The firm manufactures specialized combustion and heat transfer equipment including gas, oil and combination high velocity burners, heat exchangers, air heaters.

Quelcor Forms Subsidiary

The formation of *Quelcor of Cincinnati, Inc.*, as a subsidiary has been announced by *Quelcor, Inc.*, Chester, Pa. The new organization will extend the firm's activities in the field of corrosion resistant plastisols into an area where customer demand has been continually increasing.

The new plant combines the broad



John Kozacik

experience of technical personnel in the Ohio area with the specialized skills of the Chester plant in rigid polyvinyl chloride fabrication, tank linings, dip coating of large sections and moulding of plastisol parts.

Quelcor of Cincinnati will operate under the direction of *John Kozacik*, president, and *Raymond Mueller*, secretary-treasurer. Mueller is President of

Prompt Delivery NICKEL ANODES

NICKEL SULFATE

NICKEL CARBONATE

NICKEL CHLORIDE

COPPER CYANIDE

All Plating Chemicals

Automatic Plating & Polishing Equipment

IRITOX CHEMICAL COMPANY

5 Union Square West, New York 3, N. Y.

WAtkins 4-1977

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Application and Process
Development in the Fields
of Organic and Plated
Coatings

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Employment Department
Scientific Personnel Section F.

THE NATIONAL CASH REGISTER COMPANY

Dayton 9, Ohio

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Raymond Mueller

Ray Mueller and Associates and he will handle the sales function.

Kozacik, a Purdue graduate, class of 1934, has been assistant manager at Toms River — Cincinnati Chemical Corp., Cincinnati, Ohio and Toms River, N. J. He was a member of the company's executive management committee. Previously he had been associated with General Chemical Co.,

Camden, N. J.; The Barrett Co., Chicago, Illinois; Commercial Solvents Corp., Terre Haute, Ind. and Carbide and Carbon Chemical Corp., Whiting, Ind.

Kozacik is a member of the Engineering Society of Cincinnati, a past president of the National Association of Foremen, and a member of the speaker's committee of the local Chemical Progress chapter.

H-VW-M Names Shockley to West Coast Sales Post

Hanson-Van Winkle-Munning Co. has announced the appointment of H. Don Shockley as rectifier sales engineer for the west coast district.

In this capacity he will assist in the selling and servicing of rectifiers for metal finishing operations, particularly electroplating and anodizing. He will work through and with H-VW-M personnel and offices in Los Angeles and San Francisco. He will also expand the company's efforts in the industrial rectifier field, especially aircraft production applications.

Previous to joining the firm, Mr.



H. Don Shockley

Shockley was with J. B. Seage, Inc., industrial engineering contractors, serving first as engineer and then chief engineer. During this time he had considerable experience in the installation of electroplating equipment, particularly rectifiers. Before working with Seage, Mr. Shockley spent a short time with the Western Gear Works of Lynwood, California as project engineer.

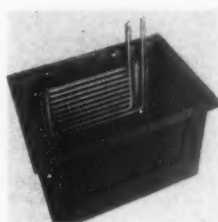
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He is a graduate of the University of Southern California where he received his B. E. in mechanical engineering in 1950.

King Co. Offers Plastisol Coatings

Alfred B. King Co., Devine St., North Haven, Conn. announces it is now offering a specialized protective coating service for electroplating equipment subject to rust or corrosion.

The company states that it will apply plastisol coatings in their North Haven plant, and will arrange for necessary transportation of equipment to be coated to and from their plant.

Olin Mathieson Appoints Weeks

Kenneth L. Weeks, Jr. has been appointed superintendent of Olin Mathieson Chemical Corp. operations at Brunswick, Ga. Now under construction, the Brunswick facilities are expected to be ready for use shortly after the first of the year. They will



Kenneth L. Weeks, Jr.

provide chlorine and caustic soda for use in the manufacture of finished chemicals in the South Atlantic states.

Mr. Weeks joined the company in 1952 as a foreman at its McIntosh, Ala., plant and was made purchasing agent at that location a year ago. He was previously with the Allied Chemical and Dye Corp. at Huntsville, Ala.

Associations and Societies

AMERICAN ELECTROPLATERS' SOCIETY

Montreal A.E.S. Convention

The 44th Annual Convention of the American Electroplaters' Society will be held at the Sheraton-Mount Royal Hotel in Montreal, Canada, June 16-20, 1957.

General Chairman Ross Davidson reports an active group of committees busily engaged pulling all the stops for a successful convention, returning to the Canadian Metropolis for the first time in a quarter century. The Montreal Branch, founded in 1920 by the late John H. Feeley, first played host to the AES 1925 Convention and, inspired by the privilege of playing hosts again, are driving to make this a convention to be long remembered.

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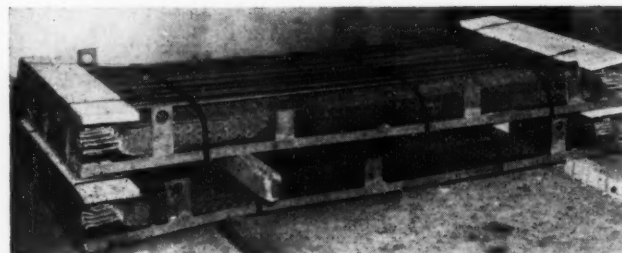
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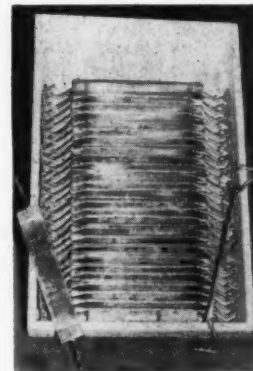
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Ross Davidson

tional Committee, under Chairman Philip M. Coady and associate Dr. J. Kane, is piecing together a program of technical papers reflecting major advances. Featuring five single sessions, the program promises versatility and convenience, along with educational interest. The Educational Board of the Society meets in Montreal on January 18, 1957 to appraise abstracts.

It is estimated that some 1,500 American delegates will join their Canadian fellow delegates at the Sheraton-Mount Royal, in the heart of Montreal, the "Paris of North America," where hospitality is a strong tradition and custom.

And, of course, this famous convention center with the European atmosphere is the stepping-off point for millions annually seeking recreation in the rugged luxury of the Laurentian Mountains, or scenic resorts along the St. Lawrence.

There's adventure in good eating and entertainment in this city of a million and a half, where French and English speaking peoples contribute to a way of life found no where else on the continent.

Newark Branch

The Newark Branch is pleased to announce the dates for its annual Educational Session and Christmas Party.

Both affairs will be held at the Robert Treat Hotel in Newark. The Educational Session will take place on Friday, December 14. The scheduled speakers are W. K. Murray of Enthone,

Inc., whose topic will be, "Overcoming Problems in Electroplating"; and E. L. Combs of Diamond Alkali Co., who will discuss, "Decorative and Hard Chromium Plating."

On Saturday, December 15, the Christmas Party, one of the important high points of the year, will be held. An excellent program has been planned, and we cordially invite you to participate in this activity.

New York Branch

The New York Branch will hold its Annual Educational Session and Banquet at the Hotel Statler, New York City, on Saturday, March 2, 1957.

The technical session will be held in the afternoon and the banquet in the evening.

Central Michigan Branch

The Central Michigan Branch held its first dinner-program meeting, after the summer recess, on October 9, at the Porter Hotel in Lansing.

About 35 members and guests were in attendance, with President G. S. Woodruff conducting the business

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meeting, which covered an excellent financial report on the last month's golf stag, the unveiling of the Branch's new slide projector, and a discussion on membership. The feature speaker of the evening was *Frank K. Savage*, of the Savage-Rowe Plating Co., Inc., who gave an excellent paper on "Plating Room Cost." The evening was concluded with a social hour and refreshments.

Earl D. Creese
Publicity Secretary

Milwaukee Branch

The Milwaukee Branch will hold a symposium on April 27, 1957. The topic will be, "Important Engineering Considerations in the Plating Room."

Saginaw Valley Branch

On October 10, 1956 the October meeting of the Saginaw Valley Branch was held in the Colonial Room at Zehnder's Hotel in Frankenmuth, Mich. A rather unusual thing happened; roast beef dinners were served that night. The speciality of the house is

usually a chicken dinner. The change was welcomed and enjoyed by 76 electroplaters.

After a brief business meeting, the principal speaker of the night, *R. V. Vanden Berg* of Aluminum Co. of America, was introduced. Mr. Vanden Berg's topic of discussion was, "Commercial Anodic Treatment of Aluminum Alloys." The talk was very informative and interesting, especially the chemistry of the anodic films.

A question and answer period followed, during which time members presented both specific and general questions about working with aluminum.

Charles Melekian
Recording Secretary

Chicago Branch

The October business and technical session of the Chicago Branch was held October 12, 1956 at the Western Society of Engineers, 804 East Randolph St.

The technical session was sort of a double-header program. During the first part, a former member of the

board of managers and a long time member, *Harold R. Bulenberg*, from the Material Inspection Laboratory of Sears Roebuck and Co., gave an interesting discussion of the problems involved in controlling large quantities of plated consumer goods. He told of inspection methods and specification systems used at Sears.

The main speaker of the evening was *Dr. Frederick Lowenheim* of Metal Thermit Corp., who gave a very interesting discussion on plating tin-bronze, tin-zinc, and tin-nickel alloys which covered make-up of the plating baths, operation, and control as well as the corrosion resistance of the alloys. The result of test panels which were exposed at Bayonne, New Jersey, Pittsburgh, and in Florida were discussed at some length.

After an inspiring question and answer period the meeting was closed with a rising vote of thanks to Dr. Lowenheim for a job well done.

J. C. Corre

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Reading (left to right) Elizabeth, Mary, Arthur and Henry Pierdon, Ken Huston and Margaret Pierdon. Ellen and Florence Pierdon were at the meeting but left before the picture was taken.

held its final Convention Committee meeting at the Statler Hotel in Washington.

After an excellent dinner, Chairman *Art Pierdon* expressed his appreciation for the unselfish efforts given by the committee chairmen and their members. All realized the convention was planned to give the guests the most for their money and the efforts of each was directed towards this aim. The

administrative expenses were the lowest for any of the recent conventions.

Jules Horelich, chairman of the finance committee, reported that a small profit was realized where a deficit had been expected.

Ken Huston, co-chairman, called for a final report and interesting incidents from each of the chairmen. He then presented the chairman with an engraved album containing about 50

Kodachrome pictures of convention activities. It also contained black and white photographs supplied by *Plating, Products Finishing and Metal Finishing*. A hand lettered frontispiece was signed by each committee member.

Syracuse Branch

On October 15, 1956 the Syracuse Branch held its monthly meeting at Turners' Hall, 619 North Salina St., Syracuse N. Y. After dinner, *Grant Snair*, a chemical engineer in the Application and Development Department of Allegheny Ludlum Steel Corp., gave a talk on "Surface Characteristics of the Stainless Steels."

The many uses of stainless steel in the automotive industry were discussed. It was interesting to note that stainless trim is chrome plated so that it will match the other plated trim.

Following the technical session, refreshments were provided by Allegheny Ludlum Steel Corp. This was through the courtesy of *Stan Goodman*, district manager, and *Lang Wagoner*, both from the Syracuse office.

During the business meeting the branch unanimously approved a reso-

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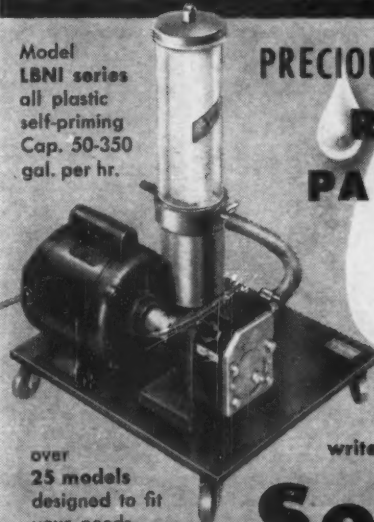
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lution giving its full support to *George Cavanaugh* who is running for third vice-president of the Society.

Preparations for the Christmas Party are well under way with *Ken Parnell* taking charge this year. It will be held at the Onondaga Hotel, Syracuse, on December 1, 1956.

There are two new members of the Syracuse Branch. They are *Edward F. Campany* a new member and *Clifford Oates* who transferred his membership from the New York Branch.

Milton F. Stevenson
Branch Secretary

Columbus Branch

On October 3rd 1956, forty-nine members and guests met at Arvin's Central Park Cafeteria in Columbus and enjoyed T-bone steaks and all the trimmings. *Tom Evans* introduced Mr. Williams, head of music department of Columbus High School, and he presented the "Blue Notes" dance band of 22 pupils. Listeners enjoyed several numbers from the band as well as vocal and instrumental solos.

Following the splendid music, *T. K. Smith* give an excellent message on three philosophies of life as portrayed

in the story of the good samaritan.

Each member made the customary introduction including guests. Minutes of the September meeting were read and accepted. Treasurer's report by *John Holland* was accepted as read. *Dr. A. Max* sent regrets for not being able to attend and word that there is room for a few more in the electroplating class since the 40 dollar fee has been established.

Nominations of delegates and alternates for the national meeting was postponed to next month in a motion by *Ed Bruck*.

An application for membership of *R. K. Niederjohn*, R. R. No. 1 Shelbyville, Ind., with G.E., was submitted and accepted.

Ezra Blount, editor of *Products Finishing* announced that the Cincinnati Branch has ratified the by-laws of the Tri-State Organization. All members of the Tri-State committee were reminded of the next meeting Oct. 9th at Fritz Andersons.

The meeting adjourned at 9:10 P.M. in a motion by *Les Renolds*.

Paul Freeman
Secretary

Pittsburgh Branch

Some fifty members of the Pittsburgh Branch enjoyed a guided tour of U. S. Steel's recently completed research laboratories in Monroeville. The group was divided into several smaller groups and a member of the laboratory staff conducted each through the spacious buildings. Two hours were required for the tour, but this allowed only a few minutes at each section of the laboratories.

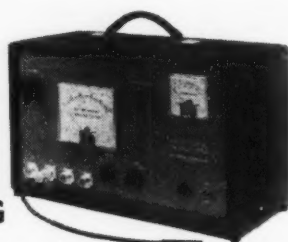
A turkey dinner at the Gateway Plaza was enjoyed by thirty-three members before the regular business meeting. President *Myron Ceresa* opened the meeting and the first item of business was the voting to membership in the Branch of *Edward B. Keller* of Steel City Electric and *Jacques G. Lussier* of Westinghouse.

Rex Goldbach then presented a fine resumé of the many contributions which *Frank Keller* of Standard Steel Spring Division, Rockwell Spring and Axle Co. has made to the Pittsburgh Branch and to the science of electroplating in years past. Frank was proposed as an Honorary Member of the

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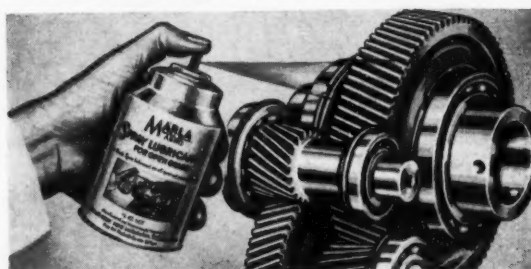
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Branch and the vote was unanimous. The formal presentation will be made at the annual Ladies Night Banquet in April at which Frank will be guest of honor.

A letter from National President *Samuel Heiman* was read, the subject of which was the possibility of having an Interim Meeting of the Supreme Society in Pittsburgh January 12. The Branch voted to make arrangements for such a meeting and also to change the regular meeting night in January to the 11th so as to have an opportunity to be host to the Executive Board and Delegates. *Herberth Head*, guest speaker for the evening, outlined what should be done to take care of the meeting.

Librarian *Dick Woehrle* then introduced Herb Head who talked on "Electroplating on Stainless Steel" and also on some of the issues of the National Society.

After a break for refreshments, Herb drew the name for the door prize. The winner was Myron Ceresa, Westinghouse. The donor was *Carl Rein-*

heimer. Westinghouse—a fine waffle iron.

A discussion of plating problems concluded the meeting.

Fred Stevens
Secretary

Newark Branch

The October meeting was held at the Robert Treat Hotel with *Clifford Struyk* presiding. Eight applications were accepted and *Thomas Furia* of Geigy Chemical Corp., *John Keating* of Kelite Corp. and *Richard Morrison* of O. S. Tyson & Co. were elected to membership. Transfers to Newark included *Edwin Rinker* of Sel-Rex Precious Metals from New York and *Emmet Archer* of Intaglio from Allentown-Reading.

William Grigat reported, as chairman of the banquet committee, that the Christmas Party would be a good one and, as chairman of the membership committee, that certain membership aids were available from him. *Dodd Carr*, chairman of the Newark Electroplating School Committee reported a new session under way at the Essex

County Vocational School with sixteen enrolled.

A. Korbela presented a resolution directed to the executive board of the Society recommending that steps be taken to request an A.E.S. stamp to be issued by the government in 1959. The resolution passed.

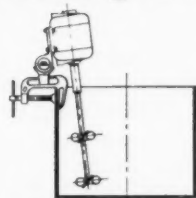
Librarian Carr then introduced the "Timely Topic" speaker, *Walter B. Kleiner*, who described the manufacture of Spiral-Glas tubing. This tubing is substantially a fiber glass pipe of high bursting strength with an inner lining (poly-vinyl or -ethylene) which renders it extremely corrosion-resistant.

Walter Helbig of Atlas Powder Co., Darco Division, as the principle speaker of the evening, discussed the uses of activated carbon with particular reference to the plating industry. He explained the activity due to the extremely large absorptive surface available for the removal of organic materials, particularly large molecules not too water-soluble. Activated carbon has been used successfully in all baths except chromium. Intermittent treatment both batch and filter cake and contin-



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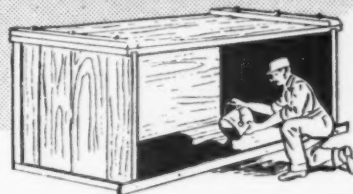
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uous treatment methods were described as well as some of the filtration factors to be considered.

The meeting with 63 in attendance adjourned at 10:15 after an interesting discussion period.

D. Gardner Foulke

AMERICAN SOCIETY FOR METALS

Announcement that a 2nd World Metallurgical Congress would be held in 1957 was made at the annual meeting of the American Society for Metals held in Cleveland, Ohio, headquarters of the huge technical society and recently scene of the 38th National Metal Exposition and Congress.

The coming World Metallurgical Congress will be staged in Chicago next year, November 2 to 8, and more than 500 metal scientists from upwards of 35 nations of the Free World are expected. Already reservations have been received from 263 conferees in 27 countries. Advance registrations from England number 45. Germany is next with 39.

The first world congress on metals

and metals processing and fabrication was held in Detroit in 1951. Staged in conjunction with the National Metal Exposition and Congress it had an attendance well over 35,000. Of this huge group, 550 were metal engineers from 33 foreign countries.

A series of special industrial plant tours plus a week of high level technical discussions on metal working operations will constitute the congress program. The 39th annual National Metal Exposition and Congress will be held at the same time as the world gathering.

ISRAEL METAL FINISHING SOCIETY

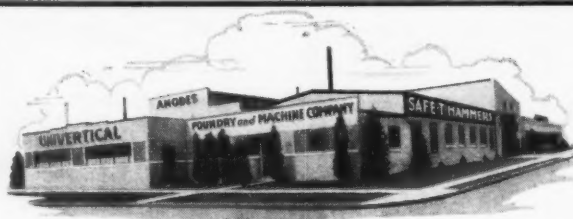
One of the newer nations, and certainly that showing the most rapid industrial growth, Israel has joined the handful of countries boasting metal finishing technical societies. On August 29th, the first general assembly of the *Ingud Technologi, le Gimur Matechel* (Metal Finishing Technical Society) was held at the Engineers' Hall in Tel Aviv.



Dr. A. Arnan
President

The Society has been founded on essentially similar lines to the *American Electroplaters' Society* and the *British Institute of Metal Finishing*. It will have a full educational program, with monthly meetings in Tel Aviv and, in the offing, is another branch in 1958 to be instituted in Haifa, the second industrial city of the country. Since

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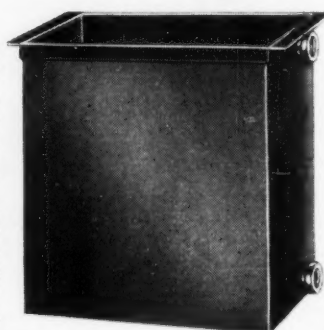
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H. C. Stern
Hon. Secretary

Israel is a small country, the Society will embrace all branches of the industry; electroplating, organic finishing, and hot-dip coating interests being represented. Technical papers will be published in the Society's own Annual Proceedings which, according to plans, will be printed in both English and Hebrew, and there are also long term

plans to publish a journal at bi-monthly or quarterly intervals. Membership dues have been fixed at the equivalent in American funds of approximately \$2.80 for industrial members and a minimum of approximately \$28.00 for corporate membership. A number of firms from different parts of the world have already agreed to support the Society by becoming corporate members, and METAL FINISHING has been informed that others will be most welcome.

First General Assembly

The first General Assembly heard a speech of welcome by *A. Taiber*, director of the Industries Division of the Ministry of Commerce and Industries. After the Constitution was read, the Assembly elected its officers and Council. The meeting then heard a paper by *Robert Pinner*, technical editor of *Electroplating & Metal Finishing*, who was present in his capacity of United Nations Technical Assistance Administration Expert. This was followed by a short address by the newly elected first president of the Society, *Dr. A.*

Arnan, director of the Standards Institute of Israel.

As Mr. Pinner had to leave the country, unexpectedly, before the meeting, his paper entitled "The Organization of the Metal Finishing Industry in Israel" was read by *H. Tabor*, director of the National Physical Laboratory of Israel. The paper described the agencies and organizations which are being established in Israel, with special emphasis on education at the level of the skilled operator, master plater, and the research and development worker, to be provided by a national apprenticeship scheme and a full time trade school course. Also described was the proposal to establish an Institute of Corrosion and Metal Finishing with the tasks of consulting, testing, and carrying on research for industry, as well as providing academic post-graduate training for those entering the industry; and the efforts now being made to encourage the establishment of supply houses capable of giving efficient technical service.

In addition to Dr. Arnan, the new

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president, the following officers were elected:

Hon. Secretary: *H. C. Stern*, director of the metal finishing section of the Ministry of Commerce and Industry, who was one of the group mainly responsible for the formation of the Society.

Hon. Treasurer: *Ing. Z. Zuckermann*, director of the Pelen-Peleese metal works in Holon.

The following were elected Honorary Members of the Presidium:

Prof. H. Heimann, professor of Chemical Engineering and Industrial Chemistry at the Technion-Israel Institute of Technology.

Prof. E. Goldberg, a world-famous specialist in the fields of optics and precision instruments, with close links to the metal finishing industry for over 40 years.

Dr. S. Wernick, honorary secretary of the *Institute of Metal Finishing* and U.N. T.A.A. expert.

Robert Pinner, U.N. T.A.A. expert.

LETTER TO THE EDITOR

341 East 74 Street
New York 21, N. Y.
October 28, 1956

Gentlemen:

I am returning your invoice unanswered. In a few short months I will reach retirement age and I will give up my trade forever. There is no one in my family engaged in this type of work to turn over your very excellent publication to. Thus you see, there is no reason for renewal.

I have been a very happy subscriber for over forty years. Your magazines have been a great deal of assistance in my daily work. I have received several excellent positions by advertising in your "Situations Wanted." I have a lot to thank you for but all good things must come to an end. Thus I remain:

Respectfully,
Charles Hajek

NEW BOOKS

Vacuum Deposition of Thin Films

By *L. Holland*. Published by *John Wiley & Sons, Inc.*, 440 Fourth Avenue, New York 16, N. Y. 1956. Price: \$10.00. 509 pages plus appendix, references, and authors and subject indexes.

For those occupied in the field of vacuum metalizing, this book will be a valuable source of information on both theory and practice, detailing, as it does very comprehensively, every aspect of the subject. About one-third of the volume is given over to evaporated aluminum films, evaporated coatings on plastics and lacquered components, and cathode sputtering. As examples of the practical viewpoint, one need only cite the inclusion of lacquer formulations for this special application, dye tinting the lacquers, and the design of work holders. As a reference source and as a text, the

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purchaser can be assured that almost all developments to date will be found in this volume or indicated in the more than 550 references quoted.

Chromium

Edited by Marvin J. Udy. Published by Reinhold Pub. Corp., 430 Park Ave., New York 22, N. Y. 1956. Price: Vol. I, \$11.00. 433 pages including index. Vol. II, \$11.00. 402 pages including index.

Volume I covers the chemistry of chromium and its compounds, with sections on chromium chemicals in corrosion prevention and the physical and chemical properties of chromium compounds of most interest to the metal finisher. The relation of chromium chemicals to health is also quite pertinent. Volume II includes sections on electrowinning of the metal from chromic acid and from chromium-alum electrolytes, and deposition of chromium by electrolysis and by other methods, among other material on the metallurgy of chromium and its alloys. It is this latter volume which is more valuable to practitioners of our art

and, although the information available here is of less significance than that to be found in the recently reviewed book on "Chromium Plating" by Morisset, et al., the much broader scope of the new A.C.S. monographs recommend them to the attention of metallurgists and engineers as sources of the latest data. Among the 30 contributors to these volumes will be found some well-known experts in electroplating and metal finishing.

News from California

By Fred A. Herr



Harold R. Smallman, Los Angeles

The Los Angeles area branch of the Hanson-Van Winkle-Munning Co. of Matawan, N. J., moved its facilities, effective November 15, from 2424 Enterprise St., Los Angeles, to 717 E. 61st St., same city.

district manager and vice-president, reported that the western branch now has 9,000 square feet of office, warehouse and manufacturing space available. In addition to warehousing H-V-W-M plating industry equipment and compounds which are manufactured in the East, the Los Angeles plant is equipped with facilities for manufacturing liquid and bar tripoli and other compounds. Still under construction, as the move to new quarters was made, was a laboratory which will be completely equipped for solution testing and brightener control. Gene Bosel is laboratory director.

Mr. Smallman also announced the appointment, effective November 1, of Don Shockley as director of rectifier and electronics research and development. Shockley served in engineering capacities with the J. B. Seage Co. of South Gate, Calif., for the past five years, the last three as chief engineer. He received his engineering training at the University of Arkansas and the University of Southern California.

Crown Chemical & Engineering Co., Los Angeles, has acquired the plant



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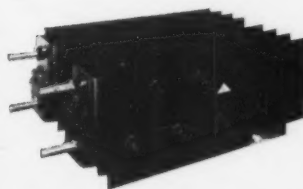
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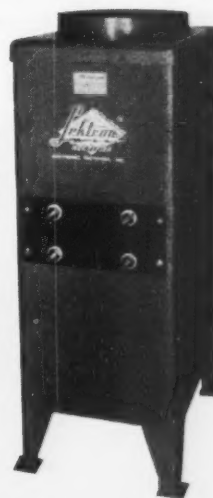
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SOME JOBBERS AND SALES TERRITORIES OPEN

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and facilities of Regulator Engineering Co. (Reyco) at 11545 W. Jefferson Blvd., Culver City, Calif. The latter plant is now being operated as the Reyco Division under the management of *Randall Lloyd*, its former president. *Jack Bealle* of Crown announced that advances are being made in equipment and personnel to expand production in all types of DC power supplies utilizing selenium and germanium junctions. Main office and plant of Crown Chemical and Engineering Co. are at 4722 Worth St., Los Angeles.

Floor plans of the exposition areas of the Pan Pacific Auditorium in Los Angeles have been sent to some 5,000 metal working, fabrication and finish-

ing equipment firms in the United States and Canada to acquaint them with the facilities that will be available for display purposes at the 10th Western Metal Congress & Exposition to be held March 25-29, 1957.

Los Angeles Chapter, American Society for Metals, will again act as local hosts and consultants on the scope of the technical sessions, whose papers in the 1957 congress will bear on production problems of the west coast metal industry. The American Welding Society, Nondestructive Testing Society, and American Institute of Mining's Metallurgical and Petroleum Engineers Society will hold technical sessions during the same week. Los Angeles Branch of the A.E.S. will hold its annual educational session on the Saturday preceding the show.

Preparations are being geared for an attendance in 1957 equaling the 53,639 who attended the 1955 show in Los Angeles, when products were displayed in 440 booths set up in the auditorium and a tent annex.

Herman Struckhoff, last year's president of the Metal Finishers Suppliers Association, now allied with *Kenneth Rapp* in the operation of Laco Engineering & Sales in Los Angeles, reports that his organization is now installed in new sales quarters at 1228 S. Atlantic Blvd., Los Angeles. The firm operates supply warehouses in Los Angeles, Gardena, and Torrance, Calif.

Armour & Company of Chicago, Ill., has announced the following new jobbers on the Pacific Coast and in Hawaii for the Ammonia Division: T. O. Bate-

man Co., San Diego; Braun Corp., L. H. Butcher Corp., Mefford Chemical Co., Western Chemical & Mfg. Co., and Wholesale Supply Co., all in Los Angeles; Los Angeles Chemical Co., South Gate, Calif.; Braun Knecht Heiman Co., Phillips Refrigeration Products, and L. H. Butcher Co., in San Francisco; Western Chemical Co., Phoenix, Ariz.; and Gaspro Products, Inc., Honolulu, H. I. *W. B. Nicholson* is western district manager for the Ammonia Division, stationed in Los Angeles.

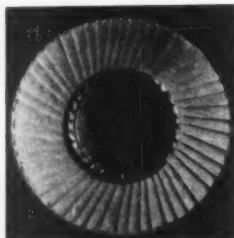
Ed and Al Price, owners of Redi-Strip Co., have just completed an expansion of their plant at 10811 S. Garfield Ave., South Gate, Calif., which places 5,400 square feet of production area at their disposal. They are set up to do paint stripping and electrolytic rust removal, and also stripping of paint from zinc, chromate, lacquer, enamel, and aluminum. The brothers Price also operate Rust Strip, Inc., at 10932 Vulcan St., South Gate, where they specialize in electrolytic rust removal.

D. B. Reeder is the recently appointed new western manager of metallurgical service for Electro Metallurgical Co. of New York, a division of Union Carbide & Carbon Corp. Mr. Reeder's former post of manager for the firm in the San Francisco region has been assigned to *H. J. Pfeifer*, formerly manager of the Houston, Tex., district.

Milton Weiner, formerly a process engineer for Rheem Mfg. Co. in Los Angeles and Convair, Inc., Pomona, Calif., has established a chemical ana-

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lytical laboratory at 671 W. Putnam Drive, Whittier, Calif. He offers consulting service and research facilities for electroplating, corrosion, and general metal finishing problems. Weiner is a registered California chemical engineer.

California Rack Co. moved its offices and factory on November 1 from 4982 Firestone Blvd., South Gate, Calif., to 1210 E. Slauson Ave., Los Angeles. The firm designs and manufactures plating racks and stainless steel baskets. The new factory contains 6,000 square feet of production area and provides the firm with a more centrally located operating point in respect to servicing the Los Angeles area plating industry. Owner *Howard Woodward* reports that new equipment in the form of a baking oven for curing rack coatings and increased tank facilities have been installed. The firm was organized by Woodward nine years ago following his resignation from the sales engineering staff of the Sundmark Supply Co. of Los Angeles.

Approximately 185 members and guests of the Los Angeles Paint & Varnish Production Club assembled at a dinner meeting in Scully's Cafe, Los Angeles, on the night of the club's regular monthly meeting to hear *Dr. F. E. Schwarchman* of the Spencer Kellogg Co. review the contributions of oil chemists during the past 15 years. He discussed catalyzed oils for rapid drying, dehydrated castor oil, maleated oils, re-esterified oil based on higher alcohols, and styrenated and vinyl toluene oils. One of the most recent advances, urethane oils, was covered in considerable detail, including a display

of samples of di-isocyanate treated castor oil for personal evaluation of the members.

The Cleveland Graphite Bronze Co., division of Clevite Corp., Cleveland, O., has opened temporary headquarters at 9218 Aqueduct Ave., Los Angeles, as a prelude to the establishment of permanent offices later on. *Joseph Pal-sulich*, former assistant chief engineer for the Cleveland firm, is in charge of the west coast operations.

SHOP PROBLEMS

(Continued from page 76)

Stripping Tin from Alloy Steel

Question: I would like some information about stripping tin plate from steel. The steel parts are used for roller bearing races. I don't know the exact alloy.

I've been stripping them but occasionally get etching on the bearing surface. I've been using an alkali solution, reverse current at six to nine volts. I've been told this etching is due to the weakness of an old solution and could remedy this situation by just strengthening the solution. I would be glad for any information you could give me on this.

W. P. D.

Answer: A number of alloy steels will be pitted when treated in highly alkaline solutions anodically. To avoid this, we would suggest that you strip at about 3-4 volts instead of 6-9 volts. Proprietary alkaline strips are also available which do not require current.

Coating with Metal Powders

Question: I want to get some metal powder aluminum, zinc and manganese samples about 1 lb. each. Also, is there any corporation with a patent on covering steel or iron with heated aluminum, zinc or manganese?

J. G. M.

Answer: Small amounts of powdered aluminum, zinc, and manganese can be obtained from any large laboratory supply house. Fisher Scientific Co., 633 Greenwich St., New York 14, N. Y. stocks these metal powders.

There are a number of patents on coating iron and steel with heated metal powders. Most of the basic patents, however, have expired, and patents still in force are mainly on specific methods of application.

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INDEX TO VOLUME 54 — METAL FINISHING

JANUARY-DECEMBER, 1956

(Compiled by N. Hall, Editor, and I. Oquendo, Edit. Ass't.)

In this index all material that appeared in the January through December 1956 issues of *Metal Finishing* is listed according to subject matter, with cross references where required. Following each listing will be found a letter indicating the manner in which the material was published, as follows:

- | | |
|---------------------------------------|-------------------------------|
| (S)—Shop Problem | (M)—Manufacturers' Literature |
| (R)—Recent Development | (T)—Technical Literature |
| (P)—Patent | (L)—Letters to the Editor |
| (A)—Abstracts from Foreign Literature | |

Any reference not followed by a letter was a feature article. The numbers in the right-hand column refer to the month and page numbers; 6-85 means June issue, page 85, etc.

ABRASIVES, BELTS—See Polishing

ACID DIPPING—See Bright Dipping and Pickling

AGITATION

Cathode Rod Agitator (M)	7- 99
Solution Agitator (R)	11- 84
Solution Agitator (M)	11- 94

ALLOY PLATING

Lacquering Plated Wire Goods (S)	1- 65
Depositing Brazing Alloys (S)	2- 72
Cadmium-Copper Alloy Bath (S)	2- 74
pH of Brass Solutions (S)	3- 69
Bright Bronze Plating Process (R)	3- 86
Alloy Electrodeposit of Zinc and Copper (R)	3- 94
Tungsten Plating (S)	4- 65
Gold Lacquered Brass (S)	4- 66
Antimony-Lead Deposits on Wire (P)	4- 68
Gold Alloy Plating Bath (P)	4- 69
Tungsten Alloy Plating (S)	5- 71
Barrel Brass Plating (S)	5- 72
Gold Alloy Bath (P)	5- 73
Investigation of the Cathode Polarization with Mutual Discharge of Iron and Tungsten Ions (R)	5- 78
Brass Brightener (R)	6-106
Tin-Zinc Bath (S)	7- 66
Golden Brass Deposits (S)	7- 67
Bright Lead-Zinc Deposits (P)	7- 68
Copper-Zinc Bath (P)	7- 72
Cobalt-Nickel Bath (P)	7- 72
Tarnish Under Lacquer (S)	8- 69
Imitation Rhodium Finish (S)	8- 70
Lead-Tin Alloy Plating (P)	8- 73
Copper-Zinc Alloy Bath (P)	8- 74
Less Common Metals and Alloys	9- 48
Cobalt-Tungsten Baths (S)	9- 70
Lead-Tin Alloy Baths (S)	9- 71
Copper-Lead Alloy Bath (P)	9- 73
Nickel Phosphide Coating (P)	10- 76
Chromium-Nickel Alloy Bath (P)	10- 77
Copper-Tin-Zinc Bath (P)	11- 72
Tin-Antimony-Copper Bath (P)	12- 78

ALUMINUM

Blackening Aluminum (S)	1- 64
Hard Nickel and Anodizing (S)	1- 64
Electrolytic Polishing of Aluminum (P)	1- 66
Corrosion Resisting Coatings (P)	1- 66
Pickling Aluminum (P)	1- 69
Problems with the Plating of Aluminum and Aluminum Alloys (A)	1- 71
Weather-Fast Colors for Anodized Aluminum (M)	1-104
Engraving Anodized Aluminum (S)	2- 72
Colored Aluminum (S)	2- 74
Pickling of Aluminum and Alloys (A)	3- 75
Photographic Reproduction on Aluminum (A)	3- 76
Brightening and Polishing Processes for Aluminum (A)	3- 77
Effect of Oxide Compactness on Determination of Thickness of Anodized Coatings by Gravimetric Methods (A)	3- 77

Chromate Conversion Coating (R)	3- 81
Pre-Enameling Process for Aluminum (R)	3- 82
Compounds for Finishing Aluminum (R)	3- 86
Galvanic Corrosion of Aluminum	4- 52
Tacky Surface on Anodized Aluminum (S)	4- 66
Porcelain Enameling Aluminum (P)	4- 69
Phosphating of Aluminum (A)	4- 73
Can Hard Anodizing be a Substitute for Hard Chromium? (A)	4- 75
Surface Treatment and Finishing of Light Metals	5- 52
Anodizing Aluminum (P)	5- 75
Anodizing Zippers (P)	5- 76
Copper-Tin Alloy Bath (P)	5- 76
The Paroxal 2 Process for Degreasing and Pickling of Aluminum (A)	5- 80
Conversion Coating for Aluminum (R)	5- 86
Surface Treatment and Finishing of Light Metals	6- 82
Etching Aluminum (S)	6- 93
Bulk Anodizing and Coloring of Small Parts in Bulk (A)	6- 99
Some Problems with Electrochemical Polishing of Aluminum and Aluminum Alloys (A)	6-104
Surface Treatment and Finishing of Light Metals	7- 48
Plating Tin on Aluminum	7- 54
Colored Finishes on Aluminum (S)	7- 66
Electroforming with Aluminum (P)	7- 70
Bright Dip for Aluminum (P)	7- 70
Surface Treatment and Finishing of Light Metals	7-102
Aluminum and Its Alloys (B)	8- 53
Surface Treatment and Finishing of Light Metals	8- 69
Plating on Aluminum (S)	8- 69
Hot Dip Aluminum (P)	8- 71
Hard Chrome Plating of Aluminum (A)	8- 75
Erosion Resistance of Anodic Oxide Films on Aluminum Alloys (A)	8- 76
Hard Chromium Plating of Aluminum and Aluminum Alloys (A)	8- 77
Surface Treatment and Finishing of Light Metals	9- 56
Voltage Breakdown of Anodized Aluminum (S)	9- 70
Bright Dip for Aluminum (P)	9- 72
Copper Coating Aluminum (P)	9- 73
Determination of Anodic Coating Thickness on Aluminum by Weight Analysis (A)	9- 74
Surface Treatment and Finishing of Light Metals	10- 66
Hot Dip Aluminum (P)	10- 75
Possibilities of Increasing the Protective Action of Anodic Oxidation Films on Aluminum (A)	10- 81
Anodic Oxidation of Aluminum and Aluminum Alloys in an Alternating Current Chromatic Acid Bath (A)	10- 81
Color Anodized Aluminum (R)	10- 88
Spangle Finished Aluminum (R)	10- 97
Anodizing Fastener Elements (P)	10-119
Plating Chromium on Aluminum (P)	10-119
Etching Aluminum (P)	10-119
Aluminum Cleaners (M)	10-123
Aluminum Alloy (M)	10-125
Surface Treatment and Finishing of Light Metals	11- 61
Composite Bearing and Method of Making Same (P)	11- 72

Etching Aluminum (P)	11- 73
Surface Treatment and Finishing of Light Metals	12- 62
Pitting of Anodized Aluminum (S)	12- 76
Anodizing Aluminum (P)	12- 77
Anodizing Aluminum (P)	12- 80
Plating on Aluminum (P)	12- 81
Plating on Aluminum (P)	12- 82
Bright Dip for Aluminum (P)	12- 82
Practical Aspects of Anodizing (A)	12- 85
Non-Sealing Aluminum Etchant (R)	12- 88
Aluminum Etchant (R)	12- 90
Plating on Aluminum (M)	12-127

ANALYSIS—See Testing

ANODES

Alkaline Tin Plating with Steel Anodes	3- 64
Influence of Chlorine Ions on the Solubility Mechanism of Nickel Anodes in Sulfate Baths (A)	6-101
Semi-Permeable Diaphragms (S)	7- 67
Welded Nickel Anode (P)	7- 70
Copper Anodes (M)	7-101
Disintegrating Nickel Anodes (S)	9- 71
Conforming Anode (P)	11- 72
Internal Anode (P)	12- 77
Lead Anodes (R)	12- 89

ANODIZING

Hard Nickel and Anodizing (S)	1- 64
Weather-Fast Colors for Anodized Aluminum (M)	1-104
Engraving Anodized Aluminum (S)	2- 72
Colored Aluminum (S)	2- 74
Photographic Reproduction on Aluminum (A)	3- 76
Effect of Oxide Compactness on Determination of Thickness of Anodized Coatings by Gravimetric Methods (A)	3- 77
Galvanic Corrosion of Aluminum	4- 52
Tacky Surface on Anodized Aluminum (S)	4- 66
Can Hard Anodizing be a Substitute for Hard Chromium? (A)	4- 75
Surface Treatment and Finishing of Light Metals	5- 52
Sulfuric Acid Anodizing Baths (S)	5- 71
Anodizing Aluminum (P)	5- 75
Anodizing Zippers (P)	5- 76
Surface Treatment and Finishing of Light Metals	6- 82
Bulk Anodizing and Coloring of Small Parts in Bulk (A)	6- 99
Surface Treatment and Finishing of Light Metals	7- 48
Colored Finishes on Aluminum (S)	7- 66
Surface Treatment and Finishing of Light Metals	8- 53
Erosion Resistance of Anodic Oxide Films on Aluminum Alloys (A)	8- 76
Surface Treatment and Finishing of Light Metals	9- 56
Voltage Breakdown of Anodized Aluminum (S)	9- 70
Determination of Anodic Coating Thickness on Aluminum by Weight Analysis (A)	9- 74
Surface Treatment and Finishing of Light Metals	10- 66

Possibilities of Increasing the Protective Action of Anodic Oxidation Films on Aluminum (A)	10-81
Anodic Oxidation of Aluminum and Aluminum Alloys in an Alternating Current Chromic Acid Bath (A)	10-81
Color Anodized Aluminum (R)	10-88
Anodizing Fastener Elements (P)	10-119
Sulfuric Anodizing (S)	11-66
Pitting of Anodized Aluminum (S)	12-76
Anodizing Aluminum (P)	12-77
Anodizing Aluminum (P)	12-80
Practical Aspects of Anodizing (A)	12-85

AUTOMATIC EQUIPMENT

Automatic Plating Machine (P)	1-78
Batch Washer for Small Parts (R)	1-79
Conveyor for Cylinders (P)	2-76
Plating Machine (P)	3-71
Automatic Conveyor (P)	3-71
Hot Dipping Machine for Tubes (P)	3-73
Pusher Type Automatic Plating Apparatus (P)	4-69
Automatic Plating Machine (M)	4-97
Automatic Plating Control (P)	5-73
Strip Plating Machine (P)	5-73
Automatic Plating Control (P)	5-74
Anodizing Zippers (P)	5-76
Automated Barrel Finishing Systems (R)	5-90
Automatic Basket Feeder and Unloader (R)	5-93
Drum Pickling Layouts for Sheet Strip Metal (A)	6-105
Small Parts Washer (R)	6-108
Cabinet Type Cleaning Machine (R)	6-110
Four-Head Conveyor-Type Belt Grinder (R)	6-113
Automatic Washing Machine (R)	6-120
Vapor Degreaser (R)	6-122
Parts Washers (R)	6-125
Crossrod Conveyorized Degreaser (R)	7-83
Wire Plating Machine (P)	8-74
Bypass Mechanism for Automatic Machines (R)	8-79
Plating Conveyor (P)	9-72
Load-Unload Mechanism (R)	9-78
I-Beam Trolley Conveyor (R)	9-90
Electroplating Apparatus (P)	10-75
Automatic Plating Conveyor (P)	10-75
Full Automatic Plater (P)	10-76
Ultrasonic Cleaning System (R)	10-85
Current Recorder and Brightener Feeder (R)	10-91
Anodizing Fastener Elements (P)	10-119
Automatic Plating Machines (M)	10-123
Electroplating (P)	11-73
Hot Dipping Metal Strip (P)	11-75
Progressive Strip Plating Machine (P)	11-75
Automatic Plating and Anodizing Machine (R)	11-78
Vibrating Parts Washer (R)	11-94

BARREL FINISHING—See Tumbling

BARREL PLATING

Barrel Plating Equipment (R)	2-85
Barrel Plating Control Unit (R)	2-87
The Capacity of Hexagonal Barrels	3-60
Brown Stain on Barrel Nickel Deposits (S)	3-68
Impact Plating (S)	4-65
Belt-Drive Plating Barrels (R)	4-78
Barrel Brass Plating (S)	5-72
Plating Barrel (R)	6-106
Utility Barrel Plater (R)	6-107
Barrel Plating Plastics (S)	7-66
Barrel Gold Plating (S)	8-70
Barrel Plating Equipment	10-61
Plating Barrel (P)	11-73

BLAST CLEANING

Blasting Apparatus (P)	3-71
Liquid Blasting Nozzle (P)	3-72
Tumble Abrasive Blasting (P)	5-75
Double Sand Blasting Nozzle (P)	5-75
Abrasive Blasting Machine (P)	5-77
Abrasive Blasting (P)	6-94
Portable Sand Blaster (P)	6-96
Blast Cleaning Apparatus (P)	7-71
Dual Operator Sandblast Machine (R)	7-83
Metallic Shot and Grit (M)	7-100
Centrifugal Blasting Apparatus (P)	8-72
Abrasive Blasting Machine (P)	8-73
Continuous Abrasive Blasting (M)	8-92
Airblast Cleaning Cabinet (M)	8-92
Airless Abrasive Blasting (M)	8-93
Sandblasting Pipe Interiors (P)	10-78
Automatic Abrasive Blaster (R)	10-91
Wet Blasting Applications (M)	10-125
Wet-Blast Equipment (M)	11-95
Wet Abrasive Dispenser (P)	12-77

BRASS PLATING—See Alloy Plating

BRIGHT DIPPING

Bright Dip for Zircium (P)	1-69
Brightening and Polishing Processes for Aluminum (A)	3-77
Bright Dip for Aluminum (P)	7-70

Characteristics and Applications of Chemical Polishing Baths (A)	8-77
Bright Dip for Aluminum (P)	9-72
Cadmium Plating Specialties (R)	10-82
Bright Dip for Aluminum (P)	12-82
Zinc Bright Dip (R)	12-86

BRIGHTENERS

Electrodeposition of Antimony (P)	1-69
Bright Plating from the Acid Copper Bath (A)	1-70
Bright Nickel Plating (P)	1-109
Source of Licorice (S)	2-72
Eliminating Excess Hypo (S)	3-68
Bright Cadmium Plating Process (R)	3-78
Bright Bronze Plating Process (R)	3-86
Bright Nickel Process (R)	3-90
Alloy Electrodeposit of Zinc and Copper (R)	3-94
Bright Nickel Plating (M)	4-94
Cadmium and Zinc Brightener (R)	5-92
Brass Brightener (R)	6-106
Bright Acid Zinc Bath (P)	7-71
Bright Copper (P)	8-72
Bright Acid Copper Bath (P)	8-73
Bright Silver Process (R)	8-90
Bright Silver Plating (P)	9-72
Bright Nickel Plating (P)	9-73
Bright Acid Copper (S)	10-73
Bright Copper Plating (P)	10-75
Acid Copper Brightener (P)	10-75
Cadmium Plating Specialties (R)	10-82
Nickel Brighteners (S)	11-70
Zinc Brightener (P)	11-72
Bright Acid Copper Bath (P)	11-74
Bright Acid Copper Bath (P)	11-75

BUFFING—See Polishing

BURNISHING—See Tumbling

CADMIUM PLATING

Conversion Coating for Cadmium (R)	2-82
Bright Cadmium Plating Process (R)	3-78
Cadmium and Zinc Brightener (R)	5-92
Cadmium Plating Specialties (R)	10-82

CHEMICALS

Solvent Cleaner (R)	1-73
Spray Cleaner Compound (R)	1-80
Industrial Chemicals (M)	1-103
Weather-Fast Colors for Anodized Aluminum (M)	1-104
Water Softeners (M)	1-105
Burnishing Compound (S)	3-68
Surface Active Agent (R)	4-80
Chemical Trade Names and Commercial Synonyms	4-92
Potassium Cyanide Solution (M)	4-95
Finishing Compounds (M)	5-109
Cleaning Materials (M)	6-139
Barrel Finishing Compounds (M)	6-139
Chemical Catalog (M)	6-140
Surfactants (M)	6-140
Chromium Plating Additive (R)	7-76
Surface-Active Agent (R)	8-81
Acid Additive and Fume Depressant (R)	8-83
Chromium Plating Additive (M)	8-91
Silicone Defoamer (R)	9-86
Safety Solvent (M)	9-94
Industrial Chemicals (M)	9-94
Sodium Orthosilicate (M)	10-124
Organic Chemicals (M)	11-96

CHROMIUM PLATING

Chromium Diffusion Coating (R)	1-76
Control of Hardness of Hard Chromium by Bath Constants (A)	1-109
Decorative Chromium (S)	2-72
Hard Chromium Specifications (S)	2-72
Chromium Plating Rack for Crankshafts (R)	3-80
Non-Reflecting Chromium Finish (S)	4-65
Chromium Plating Process (P)	4-68
Hydrogen Embrittlement in Hard Chrome Plate and Its Removal (A)	4-74
Aftertreatment of Hard Chromium Plate—Grinding and Lapping (A)	4-75
Can Hard Anodizing be a Substitute for Hard Chromium? (A)	4-75
Crack-Free Chromium Plate (A)	4-76
Chromium Fume Suppressor (R)	5-83
Tetrachromate Bath (S)	6-92
Adhesion of Chromium Coatings with Alternating Loading (A)	6-105
Chromium Plating Unit (R)	6-112
Chromium Plating Additive (R)	7-76
Covering Power in Chromium Plating Baths	8-60
Basket Chromium Plating (S)	8-69
Chromium Bath Purification (P)	8-73
Hard Chrome Plating of Aluminum (A)	8-75
Large Hard Chromium Plating Units for Ships Diesel Engine Cylinders and Pistons (A)	8-75
Mechanism of the Electrolytic Deposition Processes of Chromium (A)	8-75
Hard Chromium Plating of Cutting Tools (A)	8-76

Hard Chromium Plating of Aluminum and Aluminum Alloys (A)	8-77
Chromium Plating Additive (M)	8-91
Chromium Plated Die (P)	9-73
Chromium Plating of Light Alloy I.C. Engine Cylinders (A)	9-74
Large Chromium Tank Construction (S)	10-73
Black Chromium Bath (P)	10-77
Plating Chromium on Aluminum (P)	10-119
Hard Chromium Plating (S)	11-66
Determination of Fluosilicic and Fluoboric Acids (A)	11-77
Chromium Plating (P)	12-80
Colorimetric Determination of Iron in Hard Chromium Baths (A)	12-84
Treatment of Drag-Out on Chromium Plating Racks (A)	12-85
Lead Anodes (R)	12-86

CLEANING

Ultrasonic Cleaning Equipment (R)	1-73
Steam Cleaning Gun (R)	1-78
Batch Washer for Small Parts (R)	1-79
Spray Cleaner Compound (R)	1-80
Cleaning and Pretreatment Processes (A) Method and Apparatus for Cleaning Metal Strips (P)	1-106
Buffing Compound Cleaner (R)	2-77
Water Break After Acid Dip (S)	2-84
Removing Brazing Flux (S)	3-68
Peeling on Brass (S)	3-68
Cleaning with Solvent Detergents (M)	3-119
Metal Cleaning Equipment (M)	3-121
Plating Over Solder (S)	4-65
Cleaner-Copper Bath (S)	4-67
Tunnel Spray Washer (P)	4-72
Parts Washer (P)	4-72
Metal Cleaners (M)	4-96
Cold Spray Cleaner (R)	5-95
Solvent Detergent for Power Washers (M)	5-108
Electrolytic Degreasing Before Plating (A)	6-100
Small Parts Washer (R)	6-108
Cabinet Type Cleaning Machine (R)	6-110
Automatic Washing Machine (R)	6-120
Parts Washers (R)	6-125
Cleaning Materials (M)	6-139
Cleaning Compound Testing Apparatus (P)	7-70
Soak Cleaner (R)	7-80
Precleaning Process for Buffed Metals (R)	7-81
Nitrogen-Containing Tarnish Inhibitors in Detergent Compositions (P)	8-72
Fused Bath Cleaning (P)	8-72
Cleaning Compositions Containing Tarnish Inhibitors (P)	8-77
Non-Ferrous Metal Cleaner (R)	8-81
Cleaning Bead-Chain (S)	9-71
Phosphating Cleaner (P)	9-73
Non-Caustic Detergent (R)	9-87
Cleaning Metals and Alloys	10-57
Safety Solvent-Detergent (R)	10-82
Ultrasonic Cleaning System (R)	10-85
Low Foaming Spray Cleaners (R)	10-85
Ultrasonic Cleaner for Small Parts (R)	10-86
Magnetostriiction Transducer (R)	10-100
Aluminum Cleaners (M)	10-123
Cleaning Metals and Alloys	11-56
Alkaline Scale Remover (R)	11-78
Vibrating Parts Washer (R)	11-94
Industrial Cleaning Compounds and Solvents (M)	11-96
Buffing Compound Removal (S)	12-75
Combination Cleaning and Phosphating Process (P)	12-78
Cleaner and Deruster (R)	12-86
Liquid Detergent (R)	12-87
Metal Cleaning Slusher (R)	12-88
Aluminum Etchant (R)	12-90
Industrial Hand Cleaner (R)	12-91
Ultrasonic Transducers for Cleaning and Processing (R)	12-92
Metal Cleaning Equipment (M)	12-127
Electrolytic Cleaners (M)	12-128

COLOR BUFFING—See Polishing

COLORED SURFACE TREATMENTS

Blackening Aluminum (S)	1-64
Relieving Silver in Bulk (S)	1-65
Weather-Fast Colors for Anodized Aluminum (M)	1-104
Engraving Anodized Aluminum (S)	2-72
Colored Aluminum (S)	2-74
Steel Blue Coloration on Brass (A)	3-76
Black Oxide Coating	4-62
Tacky Surface on Anodized Aluminum (S)	4-66
Coloring Tin (S)	4-67
Metal Coloring Processes for Copper (A)	4-74
Black Coloring of Zinc (A)	4-75
Spray Patina Process for Copper and Brass (A)	4-76
Blackening of Zinc and Zinc Alloys (A)	4-77
Electrolytic Process for Surface Coloring of Brass (A)	4-77
Coloring of Brass (A)	5-78
Black Color on Tin-Copper Alloy Plate (A)	5-78
Surface Treatment and Finishing of Light Metals	7-48

Oxidize for Silver (S)	7- 66
Colored Finishes on Aluminum (S)	7- 66
Coloring Steel (P)	7- 70
Black Chromium Bath (P)	10- 77
Color Anodized Aluminum (R)	10- 88
Sulfuric Anodizing (S)	11- 66
Black Zinc and Cadmium Finish (R)	11- 78

COMPOSITIONS

Water-Soluble Burring Compound (R)	1- 80
Buffing and Polishing Compounds (M)	1-106
Polishing Belt Lubricant (R)	3- 81
Compounds for Finishing Aluminum (R)	3- 86
Polishing Compounds (M)	6-139
Buffing and Polishing Compositions (R)	8- 86

CONVERSION SURFACE TREATMENTS

Present Position of Phosphating of Steel and Non-Ferrous Metals (A)	1-107
Testing of Passivation of Zinc and Cadmium Coatings (A)	2- 81
Conversion Coating for Cadmium (R)	2- 82
Phosphating Composition (P)	3- 70
Sulfide Coating Stainless Steel (P)	3- 70
Chromate Conversion Coating (R)	3- 81
Stain Preventive for Zinc (R)	3- 83
Phosphate Conversion Coating (R)	3- 84
Phosphating of Aluminum (A)	4- 73
Phosphate Conversion Coating (P)	5- 73
Electrolytic Coating for Magnesium (P)	5- 74
Control Measures with Phosphating Baths (A)	5- 80
Conversion Coating for Aluminum (R)	5- 86
Conversion Coating for Zinc (P)	6- 98
Chromate Conversion Coatings (R)	6-106
Test for Chromate Film (S)	7- 66
Corrosion Prevention (P)	7- 68
Copper and Brass Sealer (R)	7- 84
Sulfide Coating Iron (S)	8- 69
Chromate Films (P)	8- 73
Modern Degreasing, Pickling and Phosphating Layouts (S)	8- 77
Conversion Coating for Aluminum and Zinc (R)	8- 78
Phosphating Cleaner (P)	9- 73
Chrome Sealers for Zinc Die Castings (R)	9- 76
Phosphating of Metals (A)	10- 79
Phosphate Conversion Coatings (M)	10-124
Conversion Coating for Zinc (R)	11- 94
Phosphate Metal Coatings (P)	12- 77
Phosphate Conversion Coating (P)	12- 77
Combination Cleaning and Phosphating Process (P)	12- 78

COPPER PLATING

Bright Plating from the Acid Copper Bath (A)	1- 70
Rough Deposits from Cyanide Copper Baths (A)	1-106
Eliminating Excess Hypo (S)	3- 68
Anode Polarization in Rochelle Copper (S)	4- 66
Cleaner-Copper Bath (S)	4- 67
Copper Backing Mirrors (P)	4- 70
Small Scale Plating (S)	5- 72
Copper Anodes (M)	7-101
Bright Copper (P)	8- 72
Bright Acid Copper Bath (P)	8- 73
Investigation of Complex Formation by the Method Electro-Conductivity (A)	8- 77
Copper Coating Aluminum (P)	9- 73
Coppering of Stainless Steel (A)	9- 74
Electron Microscopic Investigation of the Structure of Copper Deposits from Fluoroborate Baths (A)	9- 75
Silver in Acid Copper Baths (S)	10- 73
Bright Acid Copper (S)	10- 73
Bright Copper Plating (P)	10- 75
Acid Copper Brightener (P)	10- 75
Production of Bright Copper Coatings on Printing Rolls (A)	10- 81
Process Control Chart (R)	10- 87
Copper Sulfate-Oxalate Bath (S)	11- 67
Bright Acid Copper Bath (P)	11- 74
Bright Acid Copper Bath (P)	11- 75
Periodic Current Reverse with Copper Plating Critical Considerations (A)	11- 75

CORROSION PREVENTION

Soluble Oil Rust Inhibitors (P)	1- 66
Corrosion Preventive Paper (R)	1- 77
Tarnish and Spotting Out Preventer (R)	1- 81
Prevention of Corrosion of Metal Parts in Storage and Shipment (A)	1-107
Inhibition and Inhibitors (A)	1-108
Reduction of Acid Attack on Zinc by Inhibitors (A)	1-108
Corrosion Behaviour of Austenitic 18-8 Cr-Ni Steels in Aqueous Solutions Containing Halogens (A)	1-108
Vapor-phase Corrosion Inhibitors (P)	2- 75
Protective Coating (P)	2- 75
Rust Preventive Composition (P)	3- 71
Corrosion Inhibiting Wrapping (P)	3- 72
Vapor Phase Inhibitor (P)	3- 73
Corrosion Preventive Oil (P)	3- 74
Corrosion Preventive Oil (P)	4- 68
Prevention of Rust and Stains (S)	5- 72
Rust Preventive Compositions (P)	5- 74
Rust Inhibitor for Parts-in-Process (R)	5- 87
Rust Preventive Spray (R)	5- 93

Tarnish Preventive (R)	5- 95
Plastic Packaging Film (R)	6-126
"Immunizing" (S)	7- 67
Method of Increasing the Scaling Resistance of Metallic Objects (P)	7- 71
Volatile Corrosion Inhibitor (P)	7- 74
Temporary Anti-Rust Compound (R)	7- 78
Tarnish Under Lacquer (S)	8- 69
Rust Preventive (P)	9- 72
Rust Preventives (M)	9- 96
Rusting of Replated Steel (S)	10- 74
Vapor Phase Inhibitors (P)	10- 78
Water-Miscible Rust Preventive (R)	10- 86
Non-Flammable Corrosion Preventive (R)	10- 89
Vapor Phase Inhibitors (P)	10-118
Rust Removal (S)	11- 67
Black Zinc and Cadmium Finish (R)	11- 78
Corrosion Preventive (P)	11-106
Corrosion Preventive (P)	12- 81
Corrosion of Metals and Metal Coatings in Tropical and Sub-Tropical Climates (A)	12- 83

COSTS AND GENERAL

Technical Developments of 1955	1- 43
The Structure of Electrodeposited Metals	1- 56
Science for Electroplaters	1- 61
Toxicological Investigations on Structure of Plated Metals (A)	1- 70
Portable Plating Unit (R)	1- 73
Chemical Engineering Catalog (B)	1- 82
Science for Electroplaters	2- 69
Metallizing Machine Features Simplified	2- 90
Air Governor Control (R)	2- 91
Marking Paint (R)	2- 91
Metals Handbook—1955 Supplement (B)	2-115
Excess Job Shop Costs	3- 51
Science for Electroplaters	3- 65
Training Electroplaters (M)	3-120
Review of Zinc Industry (M)	3-121
Science for Electroplaters	4- 63
Porcelain Enameling Aluminum (P)	4- 69
Hardness and Wear Resistance of Plated Coatings (A)	4- 75
Contract Plating (M)	4- 93
Metal Finishing Services (M)	4- 95
Science for Electroplaters	5- 67
1956 Finishing Handbook and Directory (B)	5-111
Cost Factors Governing Buff Selection	6- 75
Finishes for Threaded Parts (M)	7-100
Highlights of the A.E.S. Convention	8- 48
Teflon Products (M)	8- 91
Plating on Edges and Corners	9- 65
Science for Electroplaters	10- 71
Change of Thread Dimensions in Electroplating (A)	10- 80
Accuracy Values and Statistical Control Methods in Plating Plants (A)	10- 81
Manufacturers' Directory (M)	10-125
Spray Gun for Refractory Coatings (R)	11- 86
Precision Metal Finishing (M)	11- 95
Metal Industry Handbook & Directory (B)	11-107
Science for Electroplaters	12- 72

DEGREASING

Solvent Cleaner (R)	1- 73
Solvent Degreasing (M)	1-103
Automatic Ultrasonic Cleaning Machine (M)	1-105
Cold Solvent Degreasing (S)	2- 74
Oil Removal from Tanks (P)	2- 75
Vapor Degreasing Apparatus and Method (P)	2- 77
Emulsion Cleaner (R)	2- 85
Degreasing Equipment (M)	2-102
Degreasing Tank (P)	4- 69
Vapor Spray Degreaser (R)	4- 79
Solvent Still (R)	4- 82
Vibrating Solvent Degreaser (R)	4- 89
Vapor Degreaser (M)	4- 92
Vapor Spray Degreaser (M)	4- 96
Vapor Degreaser (P)	5- 76
The Paroxal 2 Process for Degreasing and Pickling of Aluminum (A)	5- 80
Vapor Degreaser (R)	6-117
Vapor Degreaser (R)	6-122
Non-Flammable Solvent (R)	7- 78
Precleaning Process for Buffed Metals (R)	7- 81
Vapor Degreaser (R)	7- 82
Crossrod Conveyorized Degreaser (R)	7- 83
Modern Degreasing, Pickling and Phosphating Layouts (A)	8- 77
Metal Parts Degreaser (M)	8- 90
Vapor Degreasing Methods and Techniques (A)	8- 92
Solvent Vapor Degreaser (R)	9- 76
Safety Solvent (M)	9- 94
Safety Solvent-Detergent (R)	10- 82
Magnetostriiction Transducer (R)	10-100
Vibrating Parts Washer (R)	11- 94
Industrial Cleaning Compounds and Solvents (M)	11- 96
Buffing Compound Removal (S)	12- 75
Cleaning Solvents (M)	12-128

DE-IONIZATION—See Water

DESCALING—See Pickling

DIE CASTINGS

Surface Treatment of Die Castings (A)	9- 75
Chrome Sealers for Zinc Die Castings (R)	9- 76

DRYING

Burnisher and Dryer (M)	3-121
Maize Cellulose as a Finishing Material	5- 56
Prevention of Rust and Stains (S)	5- 72
Centrifugal Dryer (R)	7- 80
Industrial Ovens (M)	9- 95
Drying Plated Parts (S)	10- 74
Hot Sawdust Equipment (R)	12- 94

ELECTROCLEANING—See Cleaning

ELECTROFORMING

Separating Films (S)	1- 64
Some Tips on Electroforming	2- 52
Some Tips on Electroforming	3- 56
Some Tips on Electroforming	4- 58
Nickel Bonded Diamond Burrs (S)	6- 93
Electroforming with Aluminum (P)	7- 70
Production of Diamond Tools (S)	11- 67
Electroformed Cavities (R)	11- 90
Electroformed Wave Guide (P)	12- 77

ELECTROPOLISHING

Electrolytic Polishing of Aluminum (P)	1- 66
Electropolishing of Gold and Gold Alloys (P)	2- 76
Electropolishing of Gold Alloys (P)	2- 76
Special Pickling Procedures for Steel and Special Alloy Semi-Products, Based on Electroplating Techniques (A)	2- 80
Electropolishing of High Speed Steel Tools (A)	3- 76
Engineering Aspects of Electropolishing of Steel (A)	3- 77
Electropolishing with Rectified Current (A)	4- 76
Electropolishing Method (P)	6- 94
Electropolishing Copper (P)	6- 94
Electropolishing Method (P)	6- 95
Some Problems with Electrochemical Polishing of Aluminum and Aluminum Alloys (A)	6-104
Electrolytic Deburring (P)	7- 73
Regeneration of Electrolytes for Electropolishing of Carbon Steel (A)	8- 75
Electropolishing Solution (R)	10- 85
Electropolishing Bath (P)	11- 72
Electropolishing Mask (P)	12- 81

ETCHING—See Pickling

FILTERS AND PUMPS

Apparatus for Cleaning Filters (P)	1- 68
Acid Pump (R)	1- 80
All Plastic Self Priming Filter Pumps (R)	2- 82
Non-Metallics for Pump Impellers (R)	2- 90
Plastic Pumps (R)	2- 90
Vertical Filters (M)	2-102
Small Pumps (M)	2-104
Self-Cleaning Filter (R)	3- 78
Sintered Metal Filter (R)	3- 91
Stainless Steel Centrifugal Pump with Pedestal Mount (M)	3-119
Double-Ended Pump (M)	3-119
Centrifugal Pump (R)	4- 78
Self-Priming Filter Units (R)	4- 78
Condensate Pump (R)	4- 79
Two-Stage "Canned" Motor Pump (R)	4- 91
Solution Filters (M)	4- 93
Condensate and Vacuum Pumps (M)	4- 95
Centrifugal Pumps (R)	5- 83
Hot Spray Pump (R)	5- 95
Centrifugal Pumps (M)	5-109
Economy Hand Pump (R)	6-113
Orlon Filter Felt (R)	6-120
Submersible Corrosion-Resistant Pumps (R)	6-124
Bulletin on Filtration (M)	7-100
Canned Motor Pumps (M)	7-101
Oil and Water Extractors (R)	8- 83
Portable Electric Acid Pump (R)	8- 90
Liner for Plastic Pumps (R)	8- 91
Centrifugal Pumps (M)	9- 94
Chemical Filter Unit (R)	10- 88
Filter Pumps (M)	10-123
Process Equipment (M)	10-125
Corrosion Resistant Pump (R)	12- 89
Water Filters (M)	12-128

FIRST AID—See Safety Procedures & Equipment

GAS PLATING

Gas Plating on Molybdenum (P)	1-109
Present Position of Thermal Chromizing—Diffusion Alloying (A)	5- 81
Gas Plating (P)	7- 68
Gas Plating Hollow Objects (P)	7- 70
Gas Plating (P)	8- 71
Chromizing Process (M)	9- 93
Process for Steel-Chromium Diffusion from Gas Stream by Ceramic Fill Materials (A)	10- 79
Steel Surface Treatment by Saturation-Alloying for Increased Resistance to Heat and Corrosion (A)	10- 80
Molybdenum Coated Steel—Structure, Corrosion and Heat Resistance (A)	10- 80

Tungsten Coated Steel Surfaces (A)	10- 80
Gas Plating (P)	11- 73
Gas Plating (P)	11-106
Gas Plating (P)	12- 77

GENERATORS—See Power Supplies

GRINDING—See Polishing

HANDLING EQUIPMENT

Chemical Engineering Catalog (B)	1- 82
Materials Handling (M)	1-105
Basket Plating (P)	4- 73
Standard Wire Baskets (R)	4- 88
Drum Lift (R)	4- 89
Drum Dolly (R)	5- 91
Automatic Basket Feeder and Unloader (R)	5- 93
Drum Handling Equipment (M)	5-109
Drum Upender (R)	6-106
Corrugated Board Tote Box (R)	6-117
Tote Box Roller-Toter (R)	6-124
Conveyorized Work Bench (R)	6-124
Barrel Handling Truck (R)	6-125
Monel Degreasing Basket (R)	7- 80
Portable Rotator Drum Truck (M)	8- 91
Load-Unload Mechanism (R)	9- 78
Protective Tape Applicator (R)	9- 81
Drum Cradle Truck (R)	9- 82
Barrel Truck with Two-Wheel Safety Brakes (R)	9- 90
I-Beam Trolley Conveyor (R)	9- 90
Safe Acid Handling System (R)	10- 84
Current Recorder and Brightener Feeder (R)	10- 91
Chemical Feeders and Mixers (M)	10-124
Drum Rotators (M)	10-125
Chemical Feeder (M)	10-125
Stacking Baskets (R)	11- 92
Wire Products (M)	11- 96
Handling & Storage Equipment (M)	11- 96

HEATING AND COOLING

Stainless Steel Heat Exchanger (R)	1- 75
Packaged Boiler Line (R)	1- 76
Packaged Boilers (M)	1-105
Heat Exchangers (M)	1-105
Temperature Regulator (R)	2- 82
Temperature Controller (R)	2- 92
Corrosion-Proof Heat Exchangers (M)	2-104
Condensate Pump (R)	4- 79
Platecoils (R)	4- 88
Condensate and Vacuum Pumps (M)	4- 95
Electric Indicating Temperature Controllers (M)	4- 97
Automatic Heating Controls (M)	4- 97
Thermodynamic Steam Trap (R)	5- 92
Electric Heaters and Heating Devices (M)	5-110
Science for Electroplaters	6- 88
Low Pressure Boiler (R)	6-115
Bench Oven (R)	6-116
Plate Coils (M)	6-139
Drum Heating Coils (R)	8- 88
Heat Exchanger (M)	9- 94
Self-Powered Cooling Controls (M)	9- 94
Industrial Ovens (M)	9- 95
Liquid Coolers (R)	10- 86
Steam Generator (R)	11- 85
Blended Flame Unit for Gas or Oil Firing (R)	11- 87
Packaged Combustion Assemblies (R)	11- 89
Temperature Controller (R)	11- 91
Packaged Automatic Boilers (M)	11- 97
Unit and Blast Heaters (M)	12-127

HOT DIP COATINGS

Hot Tinning (S)	1- 64
Corrosion Resisting Coatings (P)	1- 66
Hot Tinning Oil (P)	1- 68
Chromium Diffusion Coating (R)	1- 76
Hot Dipping Machine for Tubes (P)	3- 73
Continuous Hot Dip Coating Steel (P)	4- 69
Zinc Dross Recovery (P)	4- 70
Hot Tinning (P)	4- 70
Tin Flowing Process (R)	5- 87
Hot Dip Aluminum (P)	8- 71
Hot Dip Coatings (P)	8- 72
Sheet Surface and Hot-Dip Galvanizing (A)	8- 77
Flowing Tin Plate (S)	9- 70
Defects with Hot-Dip Galvanized Sheets	9- 74
Modern Pickling Practice with Hot-Dip Galvanizing (A)	9- 75
Hot Dip Aluminum (P)	10- 75
Continuous Hot Galvanizing (P)	11- 72
Hot Dipping Metal Strip (P)	11- 75
Hot Tin Process (R)	11- 83
Tin Flowing Oil (P)	12- 82

HYDROGEN EMBRITTLEMENT

Influence of Hydrogen in Plating Processes (A)	2- 79
Hydrogen Embrittlement in Hard Chrome Plate and its Removal (A)	4- 74
Hydrogen Embrittlement Relieving (S)	10- 74

IMMERSION PLATING

Electroless Nickel Plating (A)	1- 70
Electroless Nickel Units (R)	2- 94

Electroless Nickel (P)	3- 71
Copper Backing Mirrors (P)	4- 70
Electroless Nickel (P)	4- 71
Electroless Thick Nickelling by the Nirestan Process (A)	4- 74
Immersion Tinning Processes for Brass and Copper (A)	4- 74
Electroless Gold Plating (S)	6- 93
Electroless Nickel (P)	6- 97
Electroless Nickel (P)	6- 98
Plating Tin on Aluminum	7- 54
Chemicals for Electroless Nickel Plating (S)	7- 66
Electroless Nickel Plating (A)	7- 74
Immersion Tinning (P)	9- 72
Immersion Rhodium Baths (S)	10- 74
Nickel Phosphide Coating (P)	10- 76

INHIBITORS

Inhibition and Inhibitors (A)	1-108
Reduction of Acid Attack on Zinc by Inhibitors (A)	1-108
Pickling Inhibitors in Theory and Practice (A)	5- 79
Pickling Additive (R)	6-106
Nitrogen-Containing Tarnish Inhibitors in Detergent Compositions (P)	8- 72
Cleaning Compositions Containing Tarnish Inhibitors (P)	8- 73
Effect of Organic Inhibitors on Solution of Iron in Acids — Pickling Practice (A)	8- 76

INSTRUMENTS, INDUSTRIAL

Surface Tension Meter (P)	1- 68
Transmitter for Closed Tank Level Measurement (M)	1-105
Multi-Tank Rinse Tank Controller (R)	2- 91
Rinse Tank Control (M)	2-104
Temperature Instruments (M)	3-121
Flowmeter (R)	4- 80
Solution Conductivity Control (R)	4- 87
Electric Indicating Temperature Controllers (M)	4- 97
Automatic Heating Controls (M)	4- 97
Finishing Pointers	6- 81
Thickness and Adhesion Tester (R)	6-112
Remote Electrical Transmission System (M)	6-139
Apparatus for Inspecting Tin Plate (P)	7- 68
Flowmeters (M)	7-100
Measurement of Surface Finish (P)	8- 73
Corrosion Tester (R)	8- 86
Down-Time Recorder (R)	8- 87
Electronic Thickness Tester (M)	8- 92
Solution Level Control (R)	9- 86
Electronic Potentiometer Transmits Pneumatic Signal (R)	9- 87
Non-Indicating Controllers (R)	9- 92
Abrasion Tester (R)	9- 92
Indicating Temperature Controller (R)	9- 93
Current Recorder and Brightener Feeder (R)	10- 91
Automatic Process Control (R)	10- 92
Duplex Timer (R)	10- 93
Temperature Control (R)	10- 99
Plating Test Equipment (M)	10-123
Trailer-Borne Instruments Save Manpower in Checking Plant Waste Effluents	11- 60
Temperature Controller (R)	11- 91
Instrumentation Literature (M)	11- 96
Pneumatic Controllers (M)	11- 96
Temperature Controls (M)	11- 97
Bulk-and-Capillary Temperature Controllers (M)	11- 97
Portable pH Recorder (R)	12- 94

IRON PLATING

Iron Plating Bath (P)	1- 69
Electrodepositing Iron (P)	2- 77
Heavy Iron Deposits (S)	12- 76
Iron Plating (P)	12- 81

LEAD PLATING

Electrodeposition of Antimony (P)	1- 69
Iron Ion Control in Lead Coating Bath (P)	6- 96

LEVELING

Leveling Nickel	10- 52
-----------------	--------

MAGNESIUM

Electrolytic Coating for Magnesium (P)	5- 74
Plating on Magnesium (P)	7- 70
Zinc Plating Magnesium (P)	7- 72

METALLIZING

Metallizing Glass (P)	3- 72
Conductive Coatings (M)	4- 94
Barrel Plating Plastics (S)	7- 66
Metallizing Non-Conductors (P)	11- 72
Plating Non-Conductors (R)	11- 82
Conducting Plastics (S)	12- 75

NICKEL PLATING

Hard Nickel and Anodizing (S)	1- 64
Electroless Nickel Plating (A)	1- 70

Sulfamate Nickel Plating (M)	1-103
Nickel Plated Steel (M)	1-105
Bright Nickel Plating (P)	1-109
Proposed "Substitutes for Nickel Plating"	2- 65
Decorative Chromium (S)	2- 72
Electroless Nickel Units (R)	2- 94
Brown Stain on Barrel Nickel Deposit (S)	3- 68
Dropping pH in Nickel Bath (S)	3- 68
Peeling on Brass (S)	3- 69
Electroless Nickel (P)	3- 71
Bright Nickel Process (R)	3- 90
Electroless Nickel (P)	4- 71
Electroless Thick Nickelling by the Nirestan Process (A)	4- 74
Bright Nickel Plating (M)	4- 94
Analysis of Electroplating Solutions	5- 64
Plating Over Silver and Nickel (S)	5- 72
Recovery Treatment of Waste Liquors from Unusable Nickel Plating Baths (A)	5- 80
Pitting in Nickel Plating Baths (A)	5- 81
Dulling Bright Nickel Surfaces (S)	6- 92
Rapid Nickel Plating (S)	6- 92
Nickel Bonded Diamond Burrs (S)	6- 93
Anodic Pickling and Nickel Plating of Tank Interior Using Single Electrolyte (P)	6- 97
Electroless Nickel (P)	6- 97
Electroless Nickel (P)	6- 98
Influence of Chlorine Ions on the Solubility Mechanism of Nickel Anodes in Sulfate Baths (A)	6-101
Plated Nickel Coatings from Chloride and Sulfate Solutions (A)	6-103
Chemicals for Electroless Nickel Plating (S)	7- 66
Welded Nickel Anode (P)	7- 70
Electron Microscopic Investigation of Electroplated Nickel Deposits (A)	7- 74
Electroless Nickel Plating (A)	7- 74
Manufacture of Nickel-Plated Steel (P)	8- 71
Compressively Stressed Nickel Undercoating for Rhodium (R)	8- 89
Nickel Undercoating for Rhodium (M)	8- 91
Analysis of Nickel in Plating Baths	9- 61
Nickel Adhesion on Gun Parts (S)	9- 70
Disintegrating Nickel Anodes (S)	9- 71
Bright Nickel Plating (P)	9- 73
Operational Troubles with Nickel Plating Baths and Their Removal (A)	9- 74
Leveling Nickel	10- 52
Determination of Thickness of Thin Nickel Coatings on Iron by Solution Process (A)	10- 81
High Chloride Nickel Bath	11- 65
Gold Plating on Nickel (S)	11- 66
Production of Diamond Tools (S)	11- 67
Nickel Brighteners (S)	11- 70
Plating Spectacle Frames (S)	12- 75
Pitting in Dull Nickel Bath (S)	12- 76

ORGANIC COATINGS — STOPPOFS

Lacquering Plated Wire Goods (S)	1- 65
Easily Applied Plater's Putty (R)	1- 79
Protective Coatings (M)	1-104
Transparent Protective Lacquer for Plated Metals (A)	2- 78
Spray Type Plastisol (R)	2- 91
Protective Coating Process (R)	2- 93
Polyethylene Products (M)	2-104
Sprayable Plastisols (R)	3- 80
Corrosion-Proof Coating (R)	3- 85
Corrosion-Resistant Paint (P)	3- 87
Plastic Coating Process (R)	3- 90
Synthetic Rubber Coating (M)	3-121
Gold Lacquered Brass (S)	4- 66
Strippable Paint Booth Coating (R)	5- 86
Protective Coatings (M)	5-109
Plastisol Coating Equipment (M)	5-110
Sprayable Plastisol (R)	6-126
Anti-Rust Paints (M)	6-140
Tarnish Under Lacquer (S)	8- 69
Maintenance Paint (R)	8- 85
Strippable Coating (R)	9- 81
Plastic Protective Finish (R)	9- 92
Chemical Resistant Coatings (M)	9- 96
Paint Manual (M)	9- 96
Rust and Paint Remover (R)	10- 84
Abrasion and Corrosion Resistant Coating (R)	10- 88
Surface Preparation of Steel (M)	10-124
Liquid Rubber Paint (R)	11- 81
Corrosion-Resistant Maintenance Coating (R)	12- 88
Plastisol Coating Systems (M)	12-127

OXIDIZING—See Colored Surface Treatments

PERIODIC-REVERSE PLATING

Superimposed A.C. Plating (P)	11- 74
Periodic Current Reverse with Copper Plating Critical Considerations (A)	11- 75

pH

Dropping pH in Nickel Bath (S)	3- 68
pH of Brass Solutions (S)	3- 69
Portable pH Recorder (R)	12- 94

PHOSPHATE COATINGS—See Conversion Surface Treatment

PICKLING

Pickling and Spent Acid Recovery (P)	1- 66
Molten Salt Bath Descaling (P)	1- 68
Pickling Aluminum (P)	1- 69
Pickling Methods (A)	1-107
Plating on Zirconium (P)	2- 75
Special Pickling Procedures for Steel and Special Alloy Semi-Products, Based on Electropolishing Techniques (A)	2- 80
Silver Plating Beryllium Copper	3- 48
Water Break After Acid Dip (S)	3- 68
Removing Brazing Flux (S)	3- 68
Sodium Hydride Descaling (P)	3- 73
Pickling of Aluminum and Alloys (A)	3- 75
Pickling and Pickle Recovery (P)	4- 70
Pickling and Regenerating Machine (P)	4- 71
Pickling Titanium (P)	5- 74
Pickling Copper Alloys (P)	5- 77
Continuous Closed-Circuit Pickling with Bath Regeneration (A)	5- 78
Pickling Inhibitors in Theory and Practice (A)	5- 79
The Paroxal 2 Process for Degreasing and Pickling of Aluminum (A)	5- 80
Etching Aluminum (S)	6- 93
Anodic Pickling and Nickel Plating of Tank Interior Using Single Electrolyte (P)	6- 97
Drum Pickling Layouts for Sheet Strip Metal (A)	6-105
Pickling Additive (R)	6-106
Alkaline Rust and Paint Remover (R)	6-111
Electroplating on Beryllium (P)	7- 70
Electrolytic Fused Bath Descaling Process (R)	7- 84
Pickling Process (P)	8- 73
Pickling Titanium (P)	8- 74
Scale Removal (P)	8- 74
Effect of Organic Inhibitors on Solution of Iron in Acids—Pickling Practice (A)	8- 76
Modern Degreasing, Pickling and Phosphating Layouts (A)	8- 77
Acid Additive and Fume Depressant (R)	8- 83
Modern Pickling Practice with Hot-Dip Galvanizing (A)	9- 75
Acid-Free Chemical Pickling Process for Descaling of Stainless and Heat Resisting Steels (A)	9- 75
Alkaline Deruster (R)	9- 80
Salt Bath Descaling (P)	10- 75
Pickling Waste Treatment (P)	10- 76
Comparison Between Chemical Pickling and Mechanical Scale Removing Methods for Steel (A)	10- 79
Magnetostriiction Transducer (R)	10-100
Etching Aluminum (P)	10-119
Surface Treatment and Finishing of Light Metals	11- 61
Rust Removal (S)	11- 67
Etching Aluminum (P)	11- 73
Pickling Waste Recovery (P)	11- 73
Etching Tantalum (P)	11- 75
Alkaline Scale Remover (R)	11- 78
Dry Pickling Salt (M)	11- 94
Fused Bath Descaling (M)	11- 96
Plating on Aluminum-Bronze (S)	12- 75
Plating Spectacle Frames (S)	12- 75
Pickling Waste Treatment (P)	12- 81
Cleaner and Deruster (R)	12- 86
Non-Sealing Aluminum Etchant (R)	12- 88
Aluminum Etchant (R)	12- 90

PIPING AND FITTINGS, NOZZLES, VALVES

Corrosion Resistant Pipe (M)	1-104
Corrosion Resistant Pipe Dope (R)	3- 86
Plastic Pipe (R)	4- 89
Universal Valve Covers (R)	4- 91
Thermodynamic Steam Trap (R)	5- 92
Plastic Pipe (R)	5- 97
Rubber Lining Tanks, Valves, Fittings (M)	5-111
Solenoid Valve (R)	6-121
Self-Closing Safety Drum Faucet (R)	6-123
Fiberglass Reinforced Pipe (R)	6-125
Teflon Base Pipe Sealing Compound (R)	7- 81
Pneumatic Atomizing Nozzle (R)	7- 82
Hydromatic Valve (M)	7-100
Glass Pipe and Fittings (M)	7-101
Quick Hose Coupling (R)	8- 85
Clamp Coupling (R)	8- 87
Hose Fittings (M)	8- 92
Flexible Polyethylene Pipe (R)	9- 81
Plastic Pipe, Fittings and Valves (R)	9- 83
Tin-Lined Faucet for Distilled Water (R)	9- 83
Air Blow Gun (R)	9- 88
Small Flow Control Valves (R)	9- 89
Installation of Rigid Plastic Pipe (M)	9- 96
Teflon Tubing and Lined Pipe (R)	10- 84
Automatic Gas Valves (R)	10- 90
PVC Pipe with Uniform Pressure Rating (R)	10- 97
Bronze Globe Valves (M)	10-125
Process Equipment (M)	10-125
Universal Steam Trap (R)	11- 84
Flexible Plastic Tubing (M)	11- 94
Flexible Polyethylene Pipe (M)	11- 95
Corrosion-Resistant Relief and Back Pressure Valves (R)	12- 91
Large Capacity Spray Nozzle (R)	12- 95

PITTING, PEELING, BLISTERING

Pitting in Nickel Plating Baths (A)	5- 81
Pitting in Dull Nickel Bath (S)	12- 76
Critical Consideration of Adhesion Test Methods for Plated Coatings (A)	12- 85

PLANT PRODUCTION METHODS

Selective Plating (P)	1- 69
Plating Slide Fasteners (P)	3- 70
Master Controller (R)	3- 94
High Voltage Electroplating Method (P)	6- 95
Method for Plating by Condenser Discharge (P)	6- 96
Method for Threading Strip Through a Continuous Strip Processing Line (P)	7- 73
Continuous Addition to a Plating Bath	8- 59
Electroplated Airfoil (P)	8- 71
Composite Bearing and Method of Making Same (P)	11- 72
Superimposed A.C. Plating (P)	11- 74
Plating Method (P)	12- 79
Ultrasonic Plating (P)	12- 79
Ultrasonic Transducers for Cleaning and Processing (R)	12- 92

PLASTICS—See Organic Coatings and Metalizing

PLATING MISCELLANEOUS METALS

Selective Plating (P)	1- 69
Electrodeposition of Antimony (P)	1- 69
Problems with the Plating of Aluminum and Aluminum Alloys (A)	1- 71
Portable Plating Unit (R)	1- 73
Production of Lined Bearings (P)	2- 76
Electrodeposited Coatings (P)	2- 77
Plated Bearings (P)	2- 78
Molybdenum Bath (P)	3- 70
Antimony Bath (P)	3- 71
Self-Contained Plating Unit (R)	3- 84
Iridium Baths (S)	4- 65
Tungsten Plating (S)	4- 65
Impact Plating (S)	4- 65
Electrodeposition of Manganese (P)	4- 73
Antimony Bath (P)	5- 75
High Voltage Electroplating Method (P)	6- 95
Method for Plating by Condenser Discharge (P)	6- 96
Portable Plating Unit (M)	6-139
Plating on Magnesium (P)	7- 70
Plating on Aluminum (S)	8- 69
Spot Plating (S)	8- 69
Titanium Coating (P)	8- 74
Less Common Metals and Alloys	9- 48
Plating on Edges and Corners	9- 65
Tantalum Plating (S)	9- 70
Osmium and Tungsten Plating (R)	9- 80
Rusting of Replated Steel (S)	10- 74
Surface Treatment and Finishing of Light Metals	11- 61
Metallic Coating for Wire (P)	11- 73
Plating Method (P)	12- 79
Surface Treatment of Light Metal I.C. Engine Pistons (A)	12- 82

POLARIZATION

Anode Polarization in Rochelle Copper (S)	4- 66
Science for Electroplaters	12- 72

POLISHING, BUFFING, ETC.

Cleaning Metal Strip (P)	1- 66
Buffing Stainless Steel (P)	1- 68
Gritted Cloth Wheel in New Large Sizes (R)	1- 74
Wide Face Polisher (R)	1- 75
Water-Soluble Burring Compound (R)	1- 80
Tungsten Carbide Coatings for Buffing Fixtures (R)	1- 81
Tungsten Carbide Coatings for Buffing Fixtures (M)	1-103
Abrasive Belt Applications (M)	1-104
Buffing and Polishing Compounds (M)	1-106
Abrasive Belt (P)	1-109
Buff and Core (P)	2- 75
Rubberized Abrasives Kit (R)	2- 84
Rotary Abrasive Heads (P)	3- 70
Brush Assembly (P)	3- 70
Belt Polisher (P)	3- 70
Flexible Abrasive Rope (P)	3- 71
Buffing Wheel Comb (P)	3- 81
Polishing Belt Lubricant (R)	3- 86
Compounds for Finishing Aluminum (R)	3- 94
Centerless Polishing Machine (R)	3-119
Complete Buff Line (M)	3-120
Speed Chart for Buffing and Grinding (M)	3-120
Sisal Buffs (M)	4- 66
Color Buffing for High Finish (S)	4- 68
Burnishing Mat (P)	4- 68
Polishing Wheels (P)	4- 68
Buffing Machine Attachment (P)	4- 69
Contact Roll for Abrasive Belt Polishing Machines (P)	4- 69
Abrasive Wheels (P)	4- 69
Aftertreatment of Hard Chromium Plate—Grinding and Lapping (A)	4- 75
Use of Abrasive Rolls (M)	4- 96
Belt Polisher (P)	5- 73
Buffing Head (P)	5- 76
Belt Polisher (P)	5- 77
Pattern Polishing (P)	5- 77
Lime Compound (R)	5- 83
Polishing Lathe (R)	5- 83
Steel Center Buffs (R)	5- 87
Cost Factors Governing Buff Selection	6- 75
Buffing Wheel (P)	6- 94
Belt Polishing (P)	6- 98

Cloth and Sisal Buffs (R)	6-109
Abrasive Cloth Wheels (R)	6-111
Four-Head Conveyor-Type Belt Grinder (R)	6-113
Belt Polisher (R)	6-114
Drum Sanders (R)	6-114
Impregnated Abrasive Buff (R)	6-115
Drum Sander (R)	6-116
Backstand Idler (R)	6-122
Polishing Compounds (M)	6-139
Silicone Polishing Compounds (A)	7- 74
Small Diameter Abrasive Wheel (R)	7- 82
Reciprocating and Rotating Blade Polisher (P)	8- 74
String Buffs (R)	8- 78
Cloth and Sisal Multi-Tooth Buffs (R)	8- 79
Buffing and Polishing Compositions (R)	8- 86
Centerless Bias Buff (R)	8- 88
Polishing Device (P)	9- 72
Centerless Unit Sisal Buff (R)	9- 76
Polishing Machines (R)	9- 80
Applications for Coated Abrasives (M)	9- 95
Rotary Wire Brushes (P)	10- 78
Burnishing Machine (P)	10- 78
Rotary Brush (P)	10- 78
Polishing Lathe (R)	10- 82
Double-Sewed Unit Cloth Buff (R)	10- 92
Abrasive Wheel Dresser (R)	10- 92
Grinding-Polishing Wheel (M)	10-123
Brush Finishing with Centerless Grinders (M)	10-125
Rotary Finisher and Buffer (M)	10-125
Flexible Abrasive Products (P)	11- 72
Abrasive Wheel Assembly (P)	11- 75
Buffing and Polishing of Internal Surfaces (A)	11- 76
Polishing and Buffing Machine (R)	11- 81
Open Bias Sisal Buff (R)	11- 83
Liquid Compound Applicator (R)	11- 85
Platen-Type Belt Polisher (R)	11- 88
Belt Polisher (R)	11- 91
One-Spindle Polisher Has Dust Collector (R)	11- 92
Rubberized Abrasives (R)	11- 93
Conveyor-Type Belt Grinders (M)	11- 97
Bufs for All Purposes	12- 56
Abrasive Bands (P)	12- 77
Polishing Material (P)	12- 78
Guard for Grinding or Polishing Wheels (P)	12- 80
Belt Polisher (R)	12- 87
Pleated Cloth Buff (R)	12- 91
Pressure-Cooled Buffs (R)	12- 93

POROSITY

Porosity Test Paper (R)	5- 96
Formation of Porosity with Electroplated Coatings (A)	8- 76

POWER SUPPLIES

Ultrasonic Cleaning Equipment (R)	1- 73
Selenium Rectifiers (M)	1-104
Control Transformers (M)	1-105
Rectifiers with Automatic Programming (R)	2- 82
Barrel Plating Control Unit (R)	2- 87
Selenium Rectifiers (M)	2-103
Germanium Rectifiers (M)	2-104
Voltage Sensing Rectifiers (R)	3- 83
1-5 H.P. Motor Line (R)	3- 87
Regulated D.C. Power Rectifier (R)	3- 93
The Use of Pilot Lights	4- 61
Tank Rheostats (M)	4- 97
Finishing Pointers	5- 66
Science for Electroplaters	5- 67
Small Scale Plating (S)	5- 72
Rectifier Voltage Control (R)	5- 86
Ultrasonic Equipment (R)	5- 97
Germanium Rectifiers (M)	5-109
Tank Rheostats (M)	5-110
Ultrasonic Systems and Applications (M)	5-111
Finishing Pointers	6- 81
Science for Electroplaters	6- 88
High Voltage Electroplating Method (P)	6- 95
Method for Plating by Condenser Discharge (P)	6- 96
Science for Electroplaters	7- 63
Fully-Protected Germanium Rectifier (R)	7- 79
Germanium and Selenium Rectifier Guide (M)	7- 99
Science for Electroplaters	8- 66
Science for Electroplaters	9- 66
Electric Motors (M)	10-123
Superimposed A.C. Plating (P)	11- 74
Germanium Rectifiers (R)	12- 86

PRECIOUS METAL PLATING

Relieving Silver in Bulk (S)	1- 65
Electroplating Data Chart (M)	2-103
Cold Alloy Plating Bath (P)	4- 69
Rhodium Solution for Heavy Deposits (R)	4- 78
Cold Alloy Bath (P)	5- 73
Precious Metals and Solutions (M)	5-109
Precious Metal Salts and Solutions (M)	5-110
Electroless Gold Plating (S)	6- 93
Rhodium Plating (A)	7- 74
Barrel Gold Plating (A)	8- 70
Stripping Gold (P)	9- 72
Removing Rhodium Deposits (S)	10- 73
Immersion Rhodium Bath (S)	10- 74
Gold Plating on Nickel (S)	11- 66
Non-Cracking Rhodium Plate (R)	11- 80
Hardness Measurements in Rhodium Plating (A)	12- 84

PUMPS—See Filters & Pumps

RACKS AND RACK COATINGS

Removing Copper Deposits from Brass Racks (A)	3- 77
Chromium Plating Rack for Crankshafts (R)	3- 80
Plating Apparatus for Electrical Rectifiers (P)	5- 76
Plastisol Coating Equipment (M)	5-110
Sprayable Plastisol (R)	6-126
Plating Racks (R)	6-126
Plating Rack (P)	7- 68
Cleaning Rack Tips (S)	8- 69
Plating Rack (P)	8- 74
Anodizing Rack (R)	8- 89
Sprayable Plastisol (M)	9- 95
Plating Rack (P)	10- 77
Zinc Plating Pipe Interiors (S)	11- 70
Treatment of Drag-Out on Chromium Plating Racks (A)	12- 85
Anodizing Rack (R)	12- 95

RECOVERY AND PURIFICATION METHODS

Eliminating Excess Hypo (S)	3- 68
Zinc Dross Recovery (P)	4- 70
Solvent Still (R)	4- 82
Water Purification and Cadmium Recovery (S)	5- 71
Continuous Closed-Circuit Pickling with Bath Regeneration (A)	5- 78
Recovery Treatment of Waste Liquors from Unusable Nickel Plating Baths (A)	5- 80
Iron Ion Control in Lead Coating Bath (P)	6- 96
Compressed Air Problems (M)	7-101
Chromium Bath Purification (P)	8- 73
Removal of Carbonates from Cyanide Baths with Ion Exchangers (A)	8- 75
Regeneration of Electrolytes for Electroplating of Carbon Steel (A)	8- 75
Silver in Acid Copper Baths (S)	10- 73
Pickling Waste Recovery (P)	11- 73

RECTIFIERS—See Power Supplies

RINSING — DRAGOUT

Multi-Tank Rinse Tank Controller (R)	2- 91
Rinse Tank Control (M)	2-104
Prevention of Rust and Stains (S)	5- 72
Rinsing Hints (M)	5-110

RUBBER

Rubber Lining Catalog (M)	2-103
Industrial Gloves (R)	6-111
Neoprene Coated Work Gloves (R)	6-121
Rough Finish Coated Gloves for Use in Oil, Grease, Solvents (R)	6-123

SAFETY PROCEDURES AND EQUIPMENT

Acid-Resistant Apparel (M)	2-103
Protective Clothing (M)	2-104
Air Line Respirators (M)	2-105
All-Purpose Floor Absorbent (R)	3- 82
Coated Work Gloves (R)	3- 83
Safety Goggles (R)	4- 83
Universal Valve Covers (R)	4- 91
Chromium Fume Suppressor (R)	5- 83
Industrial Gloves (R)	6-111
Neoprene Coated Work Gloves (R)	6-121
Rough Finish Coated Gloves for Use in Oil, Grease, Solvents (R)	6-123
Protective Skin Cream (R)	6-123
Blanketing Balls for Spray Control (R)	6-127
Acid Resistant Work-Clothing (R)	8- 80
Leather Gloves (R)	9- 82
Molded Work Rubbers (R)	10- 90
Rubber Gloves (M)	12-128

SILVER PLATING

Silver Plating Beryllium Copper	3- 48
Plating Over Silver and Nickel (S)	5- 72
Plating Silver on Silver (S)	6- 92
Oxidize for Silver (S)	7- 66
Semi-Permeable Diaphragms (S)	7- 67
Bright Silver Process (R)	8- 90
Bright Silver Plating (P)	9- 72
Plating on Aluminum-Bronze (S)	12- 75

SPOTTING OUT

Spotting Out of Silver (S)	1- 64
Tarnish and Spotting Out Preventer (R)	1- 81
Refinishing Auto Parts (S)	4- 65

STAINLESS STEEL

Buffing Stainless Steel (P)	1- 68
Stainless Steel Heat Exchanger (R)	1- 75
Corrosion Behaviour of Austenitic 18-8 Cr-Ni Steels in Aqueous Solutions Containing Halogens (A)	1-108
Testing of Stainless Steel for Inter-Crystalline Corrosion (A)	5- 79
"Immunizing" (S)	7- 67

Passivating Stainless Steel (S)	8- 69
Coppering of Stainless Steel (A)	9- 74
Acid-Free Chemical Pickling Process for Descaling of Stainless and Heat Resisting Steels (A)	9- 75

STANDARDS AND SPECIFICATIONS

ASTM Standards: Part I (B)	1- 82
Hard Chromium Specifications (S)	2- 72
Specifications and Tests for Electrodeposited Metallic Coatings (B)	2-115
ASTM Standards: Part 2 (B)	5-112
Air Force Certification (S)	11- 66

STOP-OFFS

Sprayable Plastisols (R)	3- 80
Plastic Plugs (R)	3- 85
Plastic Coating Process (R)	3- 90
Sprayable Plastisol (R)	6-126
Spot Plating (S)	8- 69
Electropolishing Mask (P)	12- 81

STRIPPING

Removing Copper Deposits from Brass Racks (A)	3- 77
Paint and Phosphate Coating Removal (M)	3-121
Stripping Tin from Copper (P)	4- 69
Alkaline Rust and Paint Remover (R)	6-111
Stripping Gold (P)	9- 72
Removing Rhodium Deposits (S)	10- 73
Rust and Paint Remover (R)	10- 84
Stripping Tin from Alloy Steel (S)	12-115

TANKS AND LININGS

Neoprene Sprayed Coatings and Sheet Linings (M)	1-104
Plastic Tanks (R)	2- 87
Rubber Lining Catalog (M)	2-103
Acid Brick Floor (P)	4- 68
"Sampler" of Rubber and Plastic Lining Compounds (R)	4- 86
Floor Surfacing (R)	4- 90
Polyvinyl Chloride Linings (M)	4- 93
Tanks and Linings (M)	4- 93
Field Studies of Corrosion Proofing (M)	4- 94
Corrosion-Proof Cements (M)	4- 96
Acid Proof Materials of Construction (M)	5-111
Rubber Lining Tanks, Valves, Fittings (M)	5-111
Heavy Duty Floor Resurfacer (R)	6-116
Corrosion Resistant Floors (M)	6-140
Moisture Proofing Concrete (M)	7-100
Acid-Proof Silicate Mortar (R)	8- 84
Corrosion-Proof Flooring Material (R)	8- 85
Lead-Tin Alloy Baths (S)	9- 71
Acid Proof Construction (M)	9- 95
Large Chromium Tank Construction (S)	10- 73
Fiberglass Tanks (R)	10- 82
Polyethylene Drum (R)	10- 89
Plastic Lining Process (R)	10- 96
Corrosion-Resistant Equipment (M)	11- 95

TESTING — ANALYSIS

Control of Salt Content by Crystallization	1- 60
Gold Analysis (S)	1- 65
Surface Tension Meter (P)	1- 68
Testing of Passivation of Zinc and Cadmium Coatings (A)	2- 81
Specifications and Tests for Electrodeposited Metallic Coatings (B)	2-115
Boric Acid Analysis in Nickel Solutions	3- 62
Determination of Tin on Tinplate (P)	3- 71
Effect of Oxide Compactness on Determination of Thickness of Anodized Coatings by Gravimetric Methods (A)	3- 77
Stress in Electrodeposited Coatings	4- 48
Organic Reagents for Metals (B)	4- 92
Stress in Electrodeposited Coatings	5- 58
Analysis of Electroplating Solutions	5- 64
Non-Destructive Adhesion Test (S)	5- 71
Thickness Measurement (P)	5- 73
Testing of Stainless Steel for Inter-Crystalline Corrosion (A)	5- 79
Control Measures with Phosphating Baths (A)	5- 80
Porosity Test Paper (R)	5- 96
Electrical Conductivity Measurements on Plated Metal-Coatings (A)	6-102
Corrosion Test Cabinet (R)	6-107
Thickness and Adhesion Tester (R)	6-112
Abrasion Testing Machine for Porcelain Enamels	7- 60
Analysis by Undersaturation	7- 61
Test for Chromate Film (S)	7- 66
Apparatus for Inspecting Tin Plate (P)	7- 68
Cleaning Compound Testing Apparatus (P)	7- 70
Covering Power in Chromium Plating Baths	8- 60
Measurement of Surface Finish (P)	8- 73
Corrosion Tester (R)	8- 86
Electronic Thickness Tester (M)	8- 92
Analysis of Nickel in Plating Baths	9- 61
Determination of Anodic Coating Thickness on Aluminum by Weight Analysis	9- 74
Abrasion Tester (R)	9- 92
Test Chamber (M)	9- 96
Bond and Adhesion	10- 70

Determination of Thickness of Thin Nickel Coatings on Iron by Solution Process (A)	10- 81
Process Control Chart (R)	10- 87
Plating Test Equipment (M)	10-123
Accelerated Testing of Metallic Surfaces	11- 48
Trailer-Borne Instruments Save Manpower in Checking Plant Waste Effluents	11- 60
Acetic Acid-Salt Spray Test (S)	11- 66
The Hull Cell for Testing and Control of Plating Baths (A)	11- 77
Determination of Fluosilicic and Fluoboric Acids (A)	11- 77
Measuring Additions to a Bath	12- 71
Critical Consideration of Adhesion Test Methods for Plated Coatings (A)	12- 83
Testing of Plated Coatings from the Standards Aspect (A)	12- 84
Colorimetric Determination of Iron in Hard Chromium Baths (A)	12- 84
Hardness Measurements in Rhodium Plating (A)	12- 84
Solution Analysis (M)	12-127

THEORETICAL

The Structure of Electrodeposited Metals	1- 56
Science for Electroplaters	1- 61
Topochemical Investigations on Structure of Plated Metals (A)	1- 70
Chemical and Electrochemical Surface Treatment Processes (A)	1-106
Initial Corrosion of Metals in Contact with Aqueous Solutions at Room Temperature (A)	1-108
Study of Trans-Crystalline Stress Corrosion of Ferritic and Austenitic Steels (A)	1-108
Science for Electroplaters	2- 69
Deposition Conditions and Structure of Compact Electrodeposits (A)	3- 74
Stress in Electrodeposited Coatings	4- 48
Stress in Electrodeposited Coatings	5- 58
A New Method for Researching the Mechanism of the Cathode Processes and its Application	5- 79
Electron Microscopic Investigation of Electroplated Nickel Deposits (A)	7- 74
Mechanism of the Electrolytic Deposition Processes of Chromium (A)	8- 75
Formation of Porosity with Electroplated Coatings (A)	8- 76
Investigation of Complex Formation by the Method Electro-Conductivity (A)	8- 77
Less Common Metals and Alloys	9- 48
The Action Mechanism of Surface Reactive Substances on the Electroplating of Metals (A)	9- 74
Production of Smooth, Fine-Grained Electrodeposits	11- 52
Science for Electroplaters—Electrolytes	11- 68
Science for Electroplaters—Polarization	12- 72

THROWING POWER

Practical Throwing Power	1- 53
Corrosion of Electroplated Deposits (A)	2- 80
Covering Power in Chromium Plating Baths	8- 60

TIN PLATING

Hot Tinning (S)	1- 64
Hot Tinning Oil (P)	1- 68
Alkaline Tin Plating with Steel Anodes	3- 64
Determination of Tin on Tinplate (P)	3- 71
Stripping Tin from Copper (P)	4- 69
Hot Tinning (P)	4- 70
Immersion Tinning Processes for Brass and Copper (A)	4- 74
Tin Flowing Process (R)	5- 87
Plating Tin on Aluminum	7- 54
Imitation Rhodium Finish (S)	8- 70
Flowing Tin Plate (S)	9- 70
Immersion Tinning (P)	9- 72
Acid Tin Bath (P)	9- 72
Method for Tin Plating Bunched and Braided Wire (P)	9- 73
Barrel Finisher (R)	9- 78
Electroplating (P)	11- 73
Tin Plated Copper Wire (P)	11- 75
Hot Tin Process (R)	11- 83
Tin Flowing Oil (P)	12- 82

TUMBLING AND BARREL FINISHING

Relieving Silver in Bulk (S)	1- 65
Triple Action Cutting Barrel (R)	1- 73
Handbook of Barrel Finishing (B)	1- 81
Production Barrel Finishing	2- 57
Portable Burnishing Barrel (R)	2- 86
Burnishing Compound (S)	3- 68
Multi-Barrel Machine (R)	3- 78
Combination Barrel Finisher (R)	3- 95
Tumbling Barrels (M)	3-119
Burnisher and Dryer (M)	3-121
Oblique Tumbling Barrels (P)	4- 71
Power Tilt Tumbling Barrels (R)	4- 80
Barrel Finishing Media (R)	4- 81
Tumbling Barrels (R)	4- 82
Barrel Finishing (M)	4- 93
Pocket Tumbling Units (M)	4- 95
Shop Hints on Barrel Finishing (M)	4- 96
Maize Cellulose as a Finishing Material	5- 56

Impact Plating (P)	5- 76
Replacement Tumbling Barrels (R)	5- 83
Automated Barrel Finishing Systems (R)	5- 90
Barrel Finishing Compounds (M)	6-139
Ball Burnishing Fundamentals	7- 44
New Compound for Barrel Deburring (R)	7- 78
Precision Barrel Finisher (R)	7- 78
Non-Foaming Burnishing Compound (R)	8- 78
Burnishing Compound for Zinc Die Castings (R)	8- 89
Barrel Finishing Methods and Materials (M)	8- 93
Tumbling Compound (R)	9- 76
Burnishing Compound (R)	9- 76
Barrel Finishing (M)	9- 94
Barrel Finishing (M)	9- 95
Small Lot Barrel Finisher (R)	10- 87
Multi-Barrel Finishing Unit (R)	10- 89
Precision Barrel Finishing (M)	10-124
Tumbling Barrel (R)	11- 78
Barrel Finishing Equipment	12- 65
Tumbling Barrel Stand (R)	12- 92

VACUUM DEPOSITION OF METALS

Tungsten Filaments (R)	2- 86
Vacuum Metallizing (P)	7- 73
Vacuum Metallizing (P)	8- 71
Vacuum Metallizing (S)	10- 73
Sight Glass for Vacuum Chambers (P)	12- 80
High Capacity Vacuum Pumps (R)	12- 93
High Capacity Pumps (M)	12-127

VENTILATION AND EXHAUST SYSTEMS

Air Operated Vacuum Cleaner (R)	1- 77
Auxiliary Vacuum Cleaning Tank Kit (R)	1- 78
Flexible Exhaust Hose (M)	1-104
Dust Collector (P)	2- 75
Centrifugal Fans (R)	2- 92
Centrifugal Fans (M)	2-104
Exhausters (M)	2-105
Wet Type Dust-Fume Collectors (R)	3- 84
Dust Collector (R)	3- 92
Package Type Dust Collector (M)	3-119
Roof Exhauster (R)	4- 91
Dust Collector (P)	5- 72
Air Wash Systems (R)	5- 94
Ventilation	6- 77
Venting and Fume Removal Equipment in Metal Working Processes (A)	6-104
Dry Type Air Filter (M)	6-140
Ventilation	7- 57
Light Weight Corrosion Resistant Fume Hoods (R)	7- 76
Glass-Coated Smokestacks (R)	7- 83
Exhaust Fans (M)	7-100
Dust Collectors (M)	7-101
Dust Collector (P)	8- 72
Portable Dust Collecting System (R)	8- 82
Polyethylene Tank Floats (R)	8- 82
Dust Collectors (M)	8- 91
Roof Ventilators (M)	8- 92
Roof Ventilator (R)	9- 91
Axial Flow Fans (R)	9- 93
Dust Collector (M)	9- 95
Roof Ventilator (R)	10- 98
Control of Magnesium Alloy Dust and Fumes (M)	10-124
Process Equipment (M)	10-125
Portable Dust Collector (R)	11- 82
One-Spindle Polisher Has Dust Collector (R)	11- 92
Dust Collectors (R)	11- 93

WASTES, TREATMENT AND DISPOSAL OF

Pickling and Spent Acid Recovery (P) ..	1- 66
---	-------

Article on Plating Waste Treatment (M) ..	1-104
Waste Treatment (P)	3- 72
Plating Waste Treatment and Chrome Recovery (M)	3-120
Pickling and Pickle Recovery (P)	4- 70
Pickling and Regenerating Machine (P) ..	4- 71
Industrial Waste Treatment (M)	4- 93
Industrial Waste Treatment (M)	4- 93
Recovery Treatment of Waste Liquors from Unusable Nickel Plating Baths (A)	5- 80
Waste Treatment (P)	6- 94
Mixers and Coagulators (M)	6-140
Chlorinators (R)	7- 76
Cyanide Waste Treatment (P)	9- 73
Pickling Waste Treatment (P)	10- 76
Lime Slaker (R)	10- 82
Trailer-Borne Instruments Save Manpower in Checking Plant Waste Effluents ..	11- 60
Pickling Waste Recovery (P)	11- 73
Pickling Waste Treatment (P)	12- 81

WATER

Water Softeners (M)	1-105
Fluorides in Water Supply (S)	2- 72
Impurities in Water Supply (S)	4- 67
Demineralizer (R)	4- 86
Water Still (M)	4- 95
Chemical Recovery by Ion-Exchange (M) ..	4- 96
Water Purification and Cadmium Recovery (S)	5- 71
Demineralizer and Filter Washer (M)	5-108
Mono-Column Demineralizer (R)	6-118
Distilled Water Purity Controller (R)	6-121
Small Water Demineralizer (R)	6-125
Demineralization (M)	7-101
Tin-Lined Faucet for Distilled Water (R) ..	9- 83
Dual Column Demineralizer (R)	10- 96
Multi-Column Demineralizer (P)	11- 83
Water Filters (M)	12-128

WETTING AGENTS

Surface Active Agent (R)	4- 80
Surfactants (M)	6-140
Surface-Active Agent (R)	8- 81
Acid Additive and Fume Depressant (R) ..	8- 83

ZINC PLATING

Source of Licorice (S)	2- 72
Stain Preventive for Zinc (R)	3- 83
Cadmium and Zinc Brightener (R)	5- 92
Rusting of Zinc Plated Steel (S)	6- 92
Bright Acid Zinc Bath (P)	7- 71
Zinc Plating Magnesium (P)	7- 72
Sheet Surface and Hot-Dip Galvanizing (A)	8- 77
Defects with Hot-Dip Galvanized Sheets (A)	9- 74
Modern Pickling Practice with Hot-Dip Galvanizing (A)	9- 75
Zinc Plating Pipe Interiors (S)	11- 70
Zinc Brightener (P)	11- 72
Zinc Bright Dip (R)	12- 86

INDEX TO AUTHORS

Agrawal, K. C.—Boric Acid Analysis in Nickel Solutions	3- 62
Analysis of Electroplating Solutions ..	5- 64
Brako, Frank—Analysis of Nickel in Plating Baths	9- 61
Bryan, J. M.—Plating Tin on Aluminum ..	7- 54

Doyle, Edwin F.—Cost Factors Governing Buff Selection	6- 75
Buff Selection	12- 56
Faulke, Dr. D. Gardner—Leveling Nickel ..	10- 52
Gabrielson, Gunner—Production of Smooth, Fine-Grained Electrodeposits	11- 52
Graham, Dr. A. Kenneth—Proposed "Substitutes for Nickel Plating"	2- 65
Haas, Joseph—Silver Plating Beryllium Copper	3- 48
Hall, Nathaniel—Technical Developments of 1955	1- 43
Holt, M. L.—Less Common Metals and Alloys	9- 48
Karr, William—Maize Cellulose as a Finishing Material	5- 56
Kohler, Arthur S.—Ball Burnishing Fundamentals	7- 44
Kushner, Joseph B.—Stress in Electrodeposited Coatings	4- 48, 5- 58
McMaster, Wardley D.—Accelerated Testing of Metallic Surfaces	11- 48
Mohler, J. B.—Practical Throwing Power Control of Salt Content by Crystallization	1- 53
The Capacity of Hexagonal Barrels ..	1- 60
Alkaline Tin Plating with Steel Anodes	3- 60
The Use of Pilot Lights	4- 61
Adjustment of Bath Voltage by Fixed Resistance	5- 66
Ventilation	6- 77, 7- 56
Shunting of an Ammeter	6- 81
Analysis by Undersaturation	7- 61
Continuous Addition to a Plating Bath	8- 59
Plating on Edges and Corners	9- 65
Barrel Plating Equipment	10- 61
Bond and Adhesion	10- 70
High Chloride Nickel Bath	11- 65
Barrel Finishing Equipment	12- 65
Measuring Additions to a Bath	12- 71
Pearlstein, Fred—Galvanic Corrosion of Aluminum	4- 52
Pinner, R.—Surface Treatment and Finishing of Light Metals	5-52, 6-82, 7-48, 8-53, 9-56, 10-66, 11-61, 12- 62
Polucha, Albert—Production Barrel Finishing	2- 57
Read, Dr. Harold J.—The Structure of Electrodeposited Metals	1- 56
Rousselot, Robert H.—Covering Power in Chromium Plating Baths	8- 60
Rubinstein, Marv—Some Tips on Electroforming	2-52, 3-56, 4- 58
Serota, L.—Science for Electroplaters ..	1-61, 2-69, 3-65, 4-63, 5-67, 6-88, 7-63, 8-66, 9-66, 10-71, 11-68, 12- 72
Verma, M. R.—Boric Acid Analysis in Nickel Solutions	3- 62
Analysis of Electroplating Solutions ..	5- 64
Weil, Rolf—The Structure of Electrodeposited Metals	1- 56
Wernick, Dr. S.—Surface Treatment and Finishing of Light Metals	5-52, 6-82, 7-48, 8-53, 9-56, 10-66, 11-61, 12- 62
Williams, K. K.—Excess Job Shop Costs ..	3- 51
Young, Dr. C. B. F.—Cleaning Metals and Alloys	10-57, 11- 56
Zamzow, Jr., Carl H.—Excess Job Shop Costs	3- 51

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- 1—L'Hommedieu, Model 20A, 7½ H.P. variable speed, 1500-3000 RPM.
- 1—Hammond, 5 VRO, 5 H.P. variable speed, 1500-3000 RPM.
- 6—Hammond, Type RR, double 5 H.P. and double 7½ H.P. individual spindles.
- 2—Gardner, Type 3DB, double 7½ H.P. individual spindles.
- 3—Divine, Type VCS, 5 H.P. constant speed.
- 6—L'Hommedieu #12, 7½, 10, 15 H.P. Constant speed.
- 5—Acme semi-automatic motor drive buffing workholders.
- 10—Backstand Idlers — Divine, Hammond, Portercable, Manderscheid.

GUARANTEED REBUILT PLATING RECTIFIERS — 3 PHASE, 60 CYCLE, 220/440 VOLT. COMPLETE WITH OPERATING ACCESSORIES

- 1—3000 ampere, 0-6 volt, Selenium Udylyte, self-contained.
 - 2—1500 ampere, 6-12 volt, Selenium Rapid self-contained.
 - 2—1500 ampere, 0-12 volt, Selenium Wagner, remote control.
 - 1—1500 ampere, 6 volt copper magnesium Mallory Udylyte, basic.
 - 1—400 ampere, 0-6 volt Mallory Udylyte Jr., self-contained.
- MECHANICAL PLATING BARRELS FOR CYANIDE, COMPLETE WITH MOTOR DRIVES, TANKS AND RODS**
- 6—Crown, single cylinder units.
 - 1—Crown, double cylinder unit.
 - 1—Crown, three cylinder unit.

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- 1—500 GPH, Sparkler Acid Filter.
- 1—300 GPH, Belke Acid Filter.
- 1—14" x 28" Industrial Acid Filter.
- 1—SD6-6 Alsop Cyanide Filter.

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- 1—Used Crown, semi-automatic Plating Machine (rubber lined) complete with conveyor mechanism, lead heating coils and variable speed drive. Size of tank — 24' long x 52" wide x 42" deep.

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- 1—4000/2000 ampere, 9/18 volt Chandeysson syn. 25° exciter in head. Built in 1940.
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M-G SETS — Motor 3-60-220/440

Amp.	Volt	Make
100	7½	Hobart
175	14	Delco
200	7½	Chandeysson
300	7½	Hobart
400	60/60	G. E.
500	6	Chandeysson
500/250	6/12	Elec. Prod.
500	25	Elec. Prod.
750/375	6/12	Excel
940	32	Elec. Prod.
1500	15	Star
1500	30/50	Century
1500	40/65	G. E.
1500	65	Westinghouse
1500	70	Century
2500/1250	6/12	Elec. Prod.
5000/2500	6/12	Columbia
5000/2500	9/18	Chandeysson
15000/7500	12/24	Elec. Prod.

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1100	4½" S.P.	Bayley
2344	2" S.P.	Clarage
2500	½" S.P.	American
2700	¾" S.P.	Ilg
3420	8" S.P.	New York
9000	6" S.P.	Northern

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- 4—12500/6250 Ampere, 6/12 Volt, Electric Products, Synch.
- 1—10,000/5000 Ampere, 6/12 Volt, Chandeysson, Synch., Exc.-in-head.
- 1—8000/4000 Ampere, 6/12 Volt, Chandeysson, Synch.
- 1—7500/3750 Ampere, 9/18 Volt, Hanson-Van Winkle-Munning, Synch.
- 1—6000/3000 Ampere, 6/12 Volt, Electric Products, Synch.
- 1—5000/2500 Ampere, 9/18 Volt, Chandeysson, Synch., Exc.-in-head.
- 4—3000/1500 Ampere, 12/24 Volt, Chandeysson, Exciter-in-head.
- 1—2500/1250 Ampere, 9/18 Volt, Electric Products, Synch., Exc.-in-head. 25°C.
- 1—2000/1000 Ampere, 6/12 volt, Hanson-Van Winkle-Munning.
- 1—2000/1000 Ampere, 9/18 Volt, Electric Products.
- 1—1500/750 Ampere, 12/24 volt, Chandeysson, Synch., Exc.-in-head.

— ANODIZERS —

- 1—1000 Ampere, 40 Volt, Chandeysson. 25°C.
- 1—1000 Amp., 30 V., Ideal, Exc.-in-head.
- 1—750 Ampere, 60 Volt, Hanson-Van Winkle-Munning, Synch., Exc.-in-head.
- 1—500 Ampere, 25 Volt, Chandeysson, Synch., Exc.-in-head.
- 4—400 Ampere, 40 Volt, Separately Excited.

— RECTIFIERS —

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- 1—Green Selectoplater, 1800 Ampere, 12 Volt, 220/3/60.
- 1—1500/750 Ampere, 6/12 Volt, Udylyte-Mallory.
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— SPECIAL —

- Crown & H-VW-M Centrifugal Dryers, #1 and #2, with heat.
- 1—H-VW-M Full-Automatic Plating Machine, 87" long, 39" lift, was used for chrome.
- 1—Udylyte Semi-Automatic Plating Machine, for cyanide, size 19' long x 48" wide x 36" deep.
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10 Centrifugal Dryers: acid crocks, motor
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One fully automatic copper, nickel, chrome
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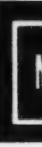
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Bison Corp. 1935 Allen Ave., S.E., Canton, Ohio		International Rustproof Corp. 1575 Merwin Ave., Cleveland 13, Ohio	112	Siefen Co., J. J. 5643 Lauderdale, Detroit 9, Mich.	51
Blakeslee & Co., G. S. 1844 S. Laramie Ave., Chicago 50, Ill.	7	Iritox Chemical Co. 5 Union Sq. West, New York 3, N. Y.	102	Simonds Abrasive Co. Philadelphia 37, Penna.	
Block & Co., Wesley 39-15 Main St., Flushing, N. Y.		Jelco Finishing Equipment Corp. 153 E. 26th St., New York 10, N. Y.		Smoothex, Inc. 10705 Briggs Rd., Cleveland 11, Ohio	46
Browning Chemical Corp. 150 Broadway, New York 38, N. Y.	105	Joe-D Buff Co. Sandwich, Ill.	30	Solvay Process Div., Allied Chemical & Dye Corp. 61 Broadway, New York 6, N. Y.	
Brucar Equipment & Supply Co. 602-604 20th St., Brooklyn, N. Y.	125	Kaykor Industries, Inc. 4400 Broad St., Yardville, N. J.	93	Sommers Bros. Mfg. Co. 3439 No. Broadway, St. Louis 7, Mo.	112
Buckingham Products Co. 14100 Fullerton Ave., Detroit 27, Mich.		Klem Chemicals, Inc. 14401 Lanson Ave., Dearborn, Mich.		Sparkler Mfg. Co. Mundelein, Ill.	78
Chandeysson Electric Co. 4074 Bingham Ave., St. Louis 16, Mo.	19	Kocour Company 4802 S. St. Louis Ave., Chicago 32, Ill.	111	Stainless Steel Corp. of America Ohio Edison Bldg., Youngstown 3, Ohio	24
Chemical Corp., The 58 Waltham Ave., Springfield, Mass.	81	Kosmos Electro-Finishing Research, Inc. Hackensack, N. J.		Stanley Chemical Co. 81 Berlin St., E. Berlin, Conn.	96
Chemical Products Corp. King Philip Rd., E. Providence, R. I.	42	Kushner, Joseph B. Stroudsburg, Pa.	112	Steadfast Industries, Inc. 4731 W. Madison St., Chicago 44, Ill.	
Chicago Wheel & Mfg. Co. 1101 W. Monroe St., Chicago, Ill.		Land, Inc., L. J. 146-148 Grand St., New York 13, N. Y.	125	Stevens, Inc., Frederic B. 1808 - 18th St., Detroit 16, Mich.	43
Churchill Co., Inc., Geo. R. Hingham, Mass.		Lasalco, Inc. 2818-38 Lasalle St., St. Louis 4, Mo.	11	Stokes Corp., F. J. 5500 Tabor Rd., Philadelphia 20, Pa.	
Circo Equipment Co. 51 Terminal Ave., Clark Twp. (Rahway), N. J.		Leo Mfg. Co. 16 Cherry Ave., Waterbury 20, Conn.	34A	Storts Welding Co., Inc. 38 Stone St., Meriden, Conn.	104
Clair Manufacturing Co. Olean, N. Y.		Lea-Michigan, Inc. 14066 Stansbury Ave., Detroit 27, Mich.	104	Stutz Mfg. Co., Geo. A. 4430 Carroll Ave., Chicago 24, Ill.	13
Cleveland Process Co. 1965 E. 57th St., Cleveland 3, Ohio	105	Lea-Ron, Inc. 139-20 109th Ave., Jamaica 35, N. Y.	34B	Sulphur Products Co., Inc. Greensburg, Pa.	106
Clinton Supply Co. 112 S. Clinton St., Chicago 6, Ill.	123	L'Hammidieu & Sons Co., Chas. F. 4521 Ogden Ave., Chicago, Ill.	5	Tamms Industries, Inc. 228 N. LaSalle St., Chicago 1, Ill.	
Codman Co., F. L. and J. C. 694 Plain St., Rockland, Mass.	31	Macarr, Inc. 2543 Boston Rd., Bronx 67, N. Y.		Technic, Inc. 39 Snow St., Providence, R. I.	
Cohn Mfg. Co., Inc., Sigmund 121 S. Columbus Ave., Mt. Vernon, N. Y.	44	MacDermid, Inc. Waterbury 20, Conn.		Ther Electric & Machine Works 19 So. Jefferson St., Chicago 6, Ill.	
Conversion Chemical Corp. 98 E. Main St., Rockville, Conn.	101	Magnus Chemical Co., Inc. 11 South Ave., Garwood, N. J.		Thermex Co., Inc., N. J. 535 Bergen St., Harrison, N. J.	32
Cowles Chemical Co. 7014 Euclid Ave., Cleveland 3, Ohio		Manderscheid Co., The 212 So. Clinton St., Chicago 6, Ill.		Tranter Mfg., Inc. Lansing 4, Mich.	42
Crown Rheostat & Supply Co. 3465 N. Kimball Ave., Chicago 18, Ill.	8	Manhattan Rubber Div., Raybestos-Manhattan, Inc. 6 Willett St., Passaic, N. J.		Trerice Co., The H. O. 1420 W. Lafayette Blvd., Detroit 16, Mich.	107
Davies Supply & Mfg. Co. 4160 Meramec St., St. Louis 16, Mo.	106	Mermac Products, Inc. 515 N. Racine Ave., Chicago 23, Ill.		True-Brite Chemical Products Co. P. O. Box 31, Oakville, Conn.	90, 91
Davis-K Products Co. 135 W. 29th St., New York 1, N. Y.		Metal & Thermit Corp. Rahway, N. J.	6, 45	Unit Process Assemblies, Inc. 61 East 4th St., New York 3, N. Y.	52
Dean Thermo-Panel Coil Div., Dean Products, Inc. 613 Franklin Ave., Brooklyn 38, N. Y.	103	Michigan Buff Co. 3503 Gaylor Ave., Detroit 12, Mich.	123	U. S. Galvanizing & Plating Equipment Corp. 31 Heyward St., Brooklyn 11, N. Y.	15
Diamond Alkali Co. 300 Union Commerce Bldg., Cleveland 14, Ohio	18	Michigan Chrome & Chemical Co. 8615 Grinnell Ave., Detroit 13, Mich.	20	U. S. Stoneware Co. Akron 9, Ohio	110
Diamondaire Buff Co., Inc. 1308 Cromwell Ave., Bronx 52, N. Y.	114	Mitchell-Bradford Chemical Co. Wampus Lane, Milford, Conn.		Univertical Foundry & Machine Co. 14841 Meyers Rd., Detroit 27, Mich.	16, 17
Dixon & Rippel, Inc. Box 116, Saugerties, N. Y.	114	Motor Repair & Mfg. Co., The 1555 Hamilton Ave., Cleveland 14, Ohio	123	Walker Div., Norma-Hoffman Bearings Corp. Stamford, Conn.	
Dow Chemical Co., The Midland, Mich.	25	Murray-Way Corp. P. O. Box 180, Maple Rd. E., Birmingham, Mich.		Wallace & Tiernan, Inc. 25 Main St., Belleville 9, N. J.	98
Du-Lite Chemical Corp. Middletown, Conn.		Mutual Chemical Div., Allied Chemical & Dye Corp. 99 Park Ave., New York 16, N. Y.	12	Wolverine Metal Co. 6500 E. Robinwood Ave., Detroit 34, Mich.	41
Du Pont de Nemours & Co., E. I. Wilmington 98, Del.	28, 48	National Aluminate Corp. 6297 W. 66th Place, Chicago 38, Ill.		Wyandotte Chemicals Corp. Wyandotte, Mich.	
Electronic Rectifiers, Inc. 2102 Spann Ave., Indianapolis 3, Ind.	113	National Research Corp. Charlemonst St., Newton Highlands 61, Mass.		Zialite Corp. 92 Grove St., Worcester 5, Mass.	
Enthone, Inc. 442 Elm St., New Haven 11, Conn.	3	New Holland Machine Co. New Holland, Pa.	95		
Federated Metals Div., American Smelting & Refining Co. 120 Broadway, New York 5, N. Y.	79	Northwest Chemical Co. 9310 Roselawn Ave., Detroit 4, Mich.	23		
Finger Lakes Chemical Co. Etna, N. Y.		Norton Co. 1 New Bond St., Worcester 6, Mass.	33		



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Manufacturers' Literature

Plating on Aluminum

MacDermid, Inc.

The Alumtex process for electroplating on aluminum is fully described in Technical Data Sheet No. 13, a four-page usage and instruction sheet.

131/Circle on Readers' Service Card

Solution Analysis

Hanson-Van Winkle-Munning Co.

"Simple Methods for Analyzing Plating Solutions" is a new 36-page, two-color bulletin, prefaced by a discussion of analytical principles, use of apparatus and methods for sampling a plating solution. It then outlines in detail the necessary steps involved in 28 analytical methods for testing nickel, copper, silver and other metal finishing solutions.

Other sections of the bulletin describe necessary equipment, component chemicals of solutions, atomic weights, acid concentrations and electrochemical data. Conversion tables are included. Analytical reagents are listed for brass, cadmium, chromic acid, copper cyanide and sulfate, gold, nickel, silver, tin and zinc plating solutions.

Five photographs of the firm's laboratory illustrate different test operations performed there, which are available to company customers.

132/Circle on Readers' Service Card

Rubber Contact Wheels

Chicago Rubber Co., Inc.

The above firm has issued a four page, illustrated booklet on its solid aluminum hub rubber contact wheels, showing the different type faces and uses of each.

Also included is a list price for the wheels according to diameter, type and width of face; and a wheel application chart.

133/Circle on Readers' Service Card

High Vacuum Pumps

F. J. Stokes Corp.

The recently increased performance ratings of the above firm's rotary mechanical vacuum pumps, as well as a wealth of other useful information that will be helpful to engineers confronted with vacuum processing problems, are contained in a new, completely revised catalog.

The new catalog, No. 752, includes, in addition to specifications for the

complete line of pumps, valuable tables of formulas, constants, and conversion factors frequently used in vacuum processing; solutions to problems of pump selection for typical vacuum systems; and useful information on continuous oil purification and other maintenance procedures for high vacuum pumps.

134/Circle on Readers' Service Card

Unit and Blast Heaters

D. J. Murray Mfg. Co.

A new 4-section catalog, GP No. 956 describes Grid cast iron steam heat transfer surface unit heaters (both horizontal and down blow), blast heaters and radiators, with general treatment on corrosion in unit heaters. It describes and illustrates one-piece construction, high-test cast iron heating sections, together with air distribution charts, heating capacities, conversion tables, etc.

135/Circle on Readers' Service Card

Metal-Cleaning Equipment

Solventol Chemical Products, Inc.

A new bulletin on specialized metal-cleaning equipment has been made available to assist manufacturers in the selection of equipment to fill their needs. The bulletin describes the firm's engineering services, which include assistance in process development at the customer's plant, pilot plant and laboratory service, evaluation of equipment and processes, periodic checkups, adjustment and maintenance recommendations. Various types of equipment are illustrated, including spray washers, rotary drum washers, agitating, pickling, and drying units. Construction features are specified in detail.

136/Circle on Readers' Service Card

Plastisol Coating Systems

Quelcor, Inc.

Bulletin 83, recently revised and expanded, describes in detail a new

December 1956

READER SERVICE DEPARTMENT — METAL FINISHING

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135
136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165
166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
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METAL FINISHING

PEOPLES TRUST BUILDING

WESTWOOD, NEW JERSEY

system being offered to industrial plants for the coating of parts and assemblies with polyvinyl chloride plastisols to ensure corrosion resistance.

The new bulletin pictures a sample layout of the system and shows the step-by-step procedure used in applying the corrosion resistant coating. Included in the bulletin is a listing of the equipment involved and the services extended in setting up such a system for corrosion prevention.

137/Circle on Readers' Service Card

Water Filters

Cochrane Corp.

Publications 6319 and 6320 provide complete details on vertical pressure water filters with positive foolproof filter control.

Both publications furnish complete operating details, filter bed materials, design features, available accessories, etc., as well as drawings that show

various arrangements of two, three and four header units.

138/Circle on Readers' Service Card

Rubber Gloves

The Wilson Rubber Co., Industrial Div.

A completely new 16-page catalog of Wil-Gard industrial gloves and finger cots includes a chart of finger cot sizes in actual diameters, and features a two-page recommended use table showing the resistance ratings of various glove materials to 199 chemicals and solvents commonly used in industry.

139/Circle on Readers' Service Card

Electrolytic Cleaners

MacDermid, Inc.

Anodex reverse-current cleaners that effectively remove all surface contaminants from the base metal before plating are fully described in Technical Data Sheet No. 4, a four-page usage and instruction sheet.

140/Circle on Readers' Service Card

Cleaning Solvents

Harry Miller Corp.

An illustrated, two color, twelve page booklet describes Immunol, a non-alkaline, non-acid detergent and rust preventive that cleans, degreases and rustproofs metal in one operation.

141/Circle on Readers' Service Card

Conversion Coating for Zinc

The Chemical Corporation.

Luster-On 52 Powder is a new low priced single dip, no leach conversion coating for zinc plated surfaces, for automatic equipment where facilities are not available for added leaching and rinsing. It gives a bright bluish hue; provides corrosion protection against staining, tarnishing and white powder products.

The material can be used in cases where cost has prohibited use of chromates in the past. It is not only low in price, but eliminates expensive handling, space-consuming storage and carboy deposits.

142/Circle on Readers' Service Card

Solution Agitator

Technic, Inc.

A new data sheet picturing the Turbomatic agitator, with specifications, is available from the above manufacturer.

Specifically designed for effectively agitating all precious metal electroplating solutions, the agitator does away with the need for stirrers, rod agitators and external pumps. It is reported to afford vigorous but smooth agitation which has not heretofore been available.

143/Circle on Readers' Service Card

Industrial Cleaning Compounds and Solvents

Brulin & Co., Inc.

A new 8-page bulletin discusses the firm's complete line of industrial cleaning compounds and solvents. Illustrated with photographs, this bulletin gives detailed information and applications of chemicals for every industrial cleaning requirement. Ranging through the various cleaners and degreaser are a liquid steam charge for light and medium-duty steam cleaning where speed and safety are required; an emulsifiable liquid concentrate for cleaning and degreasing all metal and concrete surfaces; solvent for cleaning rust, scale and corrosion from aluminum, stainless steel and most other metals.

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METAL FINISHING

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December 1956

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
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Jet Plater

A complete, versatile
small-volume
plating unit



*compact!
portable!
automatic!*

The SEL-REX "JET" PLATER is a complete electroplating unit in a compact portable cabinet. Designed and built by electroplating specialists, the "JET" PLATER incorporates a built-in rectifier with timer and other automatic features for high speed, quality work, usually found in large, mass production plating installations.

VERSATILITY—The "JET" PLATER can be used for either rack or barrel plating operations . . . a perfect small-volume unit for decorative (precious metals) or functional electroplating.

CONSISTENT HIGH QUALITY RESULTS—Pump and perforated stainless steel tube at bottom of plating tank provides swirling "JET" agitation . . . the solution moves constantly around the work for smooth, even deposits, high precision results. Solution is continuously drawn off from the bottom of the tank, circulated through the pump and filter, and returned to the tank under pressure.

"CUSTOM" DESIGNED FOR PRECIOUS METALS—The "JET" PLATER is equipped with a replaceable cartridge type filter which provides continuous filtration for high speed operations . . . ideally suited to precious metals plating. Filter may be by-passed if only intermittent filtration is desired.

*Available in standard tank capacities of 10, 20 and 30 gallon models.
Larger capacities to specifications. Send for literature.*

SEL-REX CORPORATION

Precious Metals Division

155 Manchester Place

Newark 4, N. J.

Manufacturers of SEL-REX BRIGHT GOLD • RHODIUM • SILVER

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Our "First Footing"* thought for you—

May we extend to all our friends — old and new —
our sincerest wishes for the season's joy in full measure.

**First Footing—Among Scots, a custom of gift giving, of greeting old friends with remembrances and good wishes for the coming year. At Hogmanay, the Scottish New Year, a caller tries to be the first guest to cross the host's threshold—hence the name "First Footing"*

MAC DERMID

★ *Incorporated* ★

WATERBURY 20, CONNECTICUT

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